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ABSTRACT

This report is divided into seven sections. Section one deals with the design of the study which includes the basic questions asked, the nature of the data collected in order to answer these questions, and the samples upon which the statistical analyses are performed. Sections two and three are concerned with the matter of social and economic inequalities among suburban school districts and specifically with trends through time with respect to these inequalities. Sections four and five are devoted to an investigation of the determinants of local spending for education. Section six concentrates upon the role of state aid both with respect to the social and economic inequalities previously explored, and with respect to the determination of local expenditure levels. In the final section the empirical findings are summarized and some recommendations for legislative action are offered. (Author)

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Further Explorations in Human Resource Migration Among School Districts in Metropolitan Areas and the Effect of this Migration Upon School Finance

G. Alan Hickrod

Illinois State University

Normal, Illinois

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ABSTRACT

This abstract is intended for the general reader and the educational practitioner who might not have the time, or the interest, to read the entire manuscript. Legislators and other policy makers may wish to go directly to section seven, the summary and recommendations, and then work backward as their interests dictate. Hopefully our fellow research workers will feel obligated to read the whole effort and thus give us the benefit of their criticisms.

Our more important discoveries during this investigation can be catalogued as follows. We have discovered that during the period 1950 to 1960 the suburban school districts in several of our large metropolitan areas in the United States became more unequal with regard to certain social and economic characteristics. Probably the most striking single finding is that they were less equal with regard to family income at the end of the period than they were at the beginning of the period. The reader should carefully note that we are not talking about differences between central cities and the suburbs. The growing inequality between the central cities and their suburban rings is well known, and we have not added to that knowledge. What we have determined is that suburbs are becoming less alike among themselves. Furthermore, we have determined that in some of the metropolitan areas, large sectors or clusters of contiguous school districts have similar social and economic characteristics. Thus metropolitan areas may be said to be developing sectors of "advantaged" school districts and sectors of "disadvantaged" school districts. In summary, although it is an overgeneralization, it is correct to say that our findings support that bit of folk wisdom that maintains that, "the rich are getting richer, and the poor are getting poorer". At least, this is the situation as far as school districts within many metropolitan areas are concerned.

Two other, perhaps less dramatic, findings emerged that are, nevertheless, of concern to educational administrators. We have known, both by prior research and "common sense", that the amount of money a school district spends on education is directly dependent upon the material and human resources of that district. What we did not know was that dependency of expenditure upon resources was increasing with the passage of time. Toward the end of the decade this dependency was so great that we have concluded that an administrator's behavior has very little to do with the level of funding in a school

district. The level of funding appears to be overwhelmingly determined by forces outside the control of the administrator. Secondly, we have uncovered evidence which suggests that the attempts of many state grant-in-aid formulae to "equalize" expenditure levels and tax effort among local school districts have met with very little success. In fact, they have failed so badly in some areas that a situation of "aid to the wealthy" had developed by the end of the decade.

On the basis of these findings and other information reported here we have concluded that a trend toward increasing "de facto" socio-economic segregation existed in many metropolitan areas during the 1950's. We have also reluctantly concluded that the general movement was away from equal educational opportunity during this decade, and not toward that goal. We believe the phenomena of increasing "de facto" socio-economic segregation among school districts will attract more attention from the legislatures, from the courts, and from educational researchers in the very near future.

The principal limitation of this study is its historical nature. However, trends as striking as those noted here for the 1950's probably did continue into the 1960's. When the 1970 census of population becomes available it will be possible to replicate this study for the 1960's. We will then be able to determine if our findings for the 1950's also held for the decade just concluded. It must be obvious that if we are to move very far in the direction of trend analysis and long-range planning in education we will have to allocate much more funds in order to get our data sooner, and to analyze it faster. We believe that the research reported here demonstrates that socio-economic trend analysis is feasible, that it has many practical implications for educational administration, and that it deserves much more support and attention than it has thus far received.

INTRODUCTION AND ACKNOWLEDGMENTS

This report is divided into seven sections. Section one deals with the design of the study which includes the basic questions asked, the nature of the data collected in order to answer these questions, and the samples upon which the statistical analyses were performed. Sections two and three are concerned with the matter of social and economic inequalities among suburban school districts and specifically with trends through time with respect to these inequalities. Since a phase of this inequality analysis is spatial in nature, the reader may wish to refer to Appendix B which contains maps constructed especially for this project as he reads section three. All supporting statistical tables are to be found in Appendix A. Sections four and five are devoted to an investigation of the determinants of local spending for education. Section six concentrates upon the role of state aid both with respect to the social and economic inequalities previously explored, and with respect to the determination of local expenditure levels. In the final section we summarize the empirical findings and offer some recommendations for legislative action.

As is true of most research efforts, we are indebted to a number of individuals for the successful completion of this project. In particular we should like to express our appreciation to Mr. Tse-Kia Tcheng for the computer work which culminated in the fifteen tables of Appendix A. We were also greatly assisted by the cartographic labors of Mr. Robert J. Cosentino which resulted in the twenty maps of Appendix B. A number of our colleagues at Illinois State University gave most unselfishly of their time, especially Dr. Paul F. Mattingly of the Department of Geography, and Dr. Gary C. Ramseyer of the Department of Psychology. In the earlier stages of the study Dr. Vernon C. Pohlmann, Department of Sociology; Dr. Eugene D. Fitzpatrick, Department of Psychology; and Dr. Bernard J. McCarney, Department of Economics, offered encouragement and support. Within the Department of Educational Administration, Dr. Ben C. Hubbard and Mr. D. Gene Watson read, and helpfully criticized, portions of this manuscript.

The collection of fiscal data was greatly facilitated by the efforts of a number of state officials. In Illinois these were: Dr. Ray Page, Superintendent of Public Instruction; Mr. A. R. Evans, Assistant Superintendent for Finance; Dr. Fred Bradshaw, Director of Claims; and Mrs. Sybil Copeland, recently retired from the Division of Finance. In Michigan our guide and principal contact was Dr. Paul DeRose, School Finance Executive; in Ohio it was Mr. John M. Parsons, Director, Division of Finance; in Missouri, Mr. Randall W. Tedlock, Director, School Finance and Statistics; and Mr. Marshall Jackson, Assistant Director, School Finance and Statistics. The data for Massachusetts was collected at an earlier point in time with the assistance of Dr. Owen B. Kiernan, Commissioner of Education.

To Dr. Eric Baber of the Office of Research Services and Grants, Illinois State University, and to Dr. Joseph A. Murnin, Region V, United States Office of Education, we express our gratitude for having sufficient confidence in our research abilities to recommend the funding of the project. Finally, this report would never have been available had it not been for the editorial and clerical work of Mrs. Emily L. Bush, secretary in the Department of Educational Administration, Illinois State University.

Whatever is found to be of merit in this manuscript we owe primarily to these individuals. The authors assume full responsibility for whatever errors of fact or opinion remain in the manuscript.

Normal, Illinois
1969

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1.0 THE DESIGN OF THE STUDY

1.1 Major Questions

Research efforts such as this are undertaken because individuals have unanswered questions that have arisen from their reading, and from their observation of the society which surrounds them. There are at least two tap roots to the effort reported here. One springs from the writings of sociologists, political scientists, and economists, who, in the late 1950's began to seriously call into question the notion of a single monolithic urban ecological structure called "suburbia" (Duncan and Duncan, 1955; Wood, 1958; Berger, 1960; Burkhead, 1961). The investigations of these social scientists suggested that not all suburbs were white, Anglo-Saxon, protestant, and most importantly affluent, but rather that suburbs constituted a very wide spectrum of social and economic types. The second root can be found in the efforts of a group of younger researchers in educational administration operating under the direction of Professor H. Thomas James at Stanford University (1961, 1963, 1966). In addition to a number of other activities, this group was using the social and economic characteristics of school districts to predict and explain levels of local spending for education. To be sure the exploration of the impact of socio-economic characteristics on expenditure was not at all new to the field of school finance, but the James group was using much more powerful statistical and research techniques than had been available to earlier generations of school finance specialists. Other streams of literature both preceded and joined these two sources and these bodies of research have been cited and briefly discussed in the "previous research" sections of this study.

The basic questions formulated from this literature can be stated very simply:

A. Are school districts becoming less alike socially and economically with the passage of time?

B. _If_ we can demonstrate this suspected increasing social and economic disparity, what effects will it have on public education?

C. What is the impact of state grants-in-aid on this situation?

When questions are stated as broadly as this they require the allocation of large amounts of funds and the services of many researchers to find the answers. Apparently policy makers in American public education have never thought that these questions merited such an investment of time and money. However, some tentative and partial answers can be established if we are willing to restrict the scope of the questions. For example, the research reported here will not deal with "all" school districts but only with suburban school districts, in fact suburban school districts in only five metropolitan areas. Of course no research design can deal with "all" time. The time segment selected here is the decade of the 1950's, the period of time elapsing between the 1950 and the 1960 census of the population in the United States. Further, only a single educational "effect" has been selected for study, the effect of changes in the social and economic characteristics of school districts upon financial support for education. Finally, only limited aspects of problems connected with state educational grants-in-aid will be explored.

There can be little doubt that restrictions such as are indicated above limit the usefulness of much administrative research from the point of view of practicing school administrators. However, even if funds and manpower were available, a considerable assumption, it might still be necessary to advance by these small steps toward the more important general questions posed by the practitioners. As Stouffer (1950) once explained, the social sciences are condemned to asking limited and restricted questions for which answers are available, rather than the more sweeping questions of social philosophy for which answers are less available. We suspect that Stouffer's dictum applies to much research in educational administration as well as to research in the social sciences.

1.2 Variables and Measurements

The nature of the questions we were asking and the relevant previous research literature were our primary guide in the selection and nomination of variables. This will become clearer in sections two and four. It became obvious, however, quite early in the study that we would need both measurements of "fiscal characteristics" of school districts and measurements of "social and economic characteristics" of school districts. This did not restrict the field of measurement very much since there are literally hundreds of measurements possible under each of these headings (Jonassen, 1959). We could have resorted at this point to a technique favored by some urban analysts, that is, the collection of data on a very large number of community variables and the subsequent reduction of this data by factor analysis methods. This is a very rigorous and useful method, however, the resources available to us suggested that we might get a greater yield if we restricted the number of our variables to those that held greatest theoretical value for social scientists and administrative researchers. We determined this theoretical merit by the literature search.

The search of the literature in school finance revealed that most current studies have tried to include operational specifications of the fiscal concepts of "expenditure", "ability", and "effort". The measurement "expenditure per pupil" had already been dictated by our desire to build upon a sizable body of research on the determinants of educational expenditure as indicated in section four. The notion of "fiscal ability" or "ability to support education" has many possible operational definitions but we settled on the one used by most researchers, namely assessed property valuations per pupil. This variable also has implications for state grant-in-aid systems and was partially selected for this purpose. "Effort" also has many possible operational specifications but again we settled for a commonly used specification of this concept, that is, tax effort for education as indicated by the tax rate for educational purposes. A fourth fiscal variable was added when it became apparent that our concerns should include at least a partial investigation of the role of the state both with regard to increasing social and economic disparities in metropolitan areas, and with regard to the impact of the state on local spending. This variable was state aid per pupil.

The operational definition of the category "social and economic characteristics" was directed by two desires. First, we wished to have the major components of the sociologist's notion of "social status" included in the study. Secondly, we wished to have variables which would reflect the economist's notion of "human resources". These concerns lead us to select percentage college educated, median family income, and an occupational index which is basically a ratio of white-collar workers to blue-collar workers. This index was suggested by some of the indexes used in the census of population of the United Kingdom. Since education, income, and occupation are highly correlated variables one might think of this as one "socio-economic" dimension. Excluded from the study are a number of other social variables such as ethnic composition, religion, race, etc. Each of these is worthy of investigation, but our concern with the expenditure determination models lead us toward the "socio-economic" and away from other interesting sociological variables. Further details concerning the seven variables used in this study may be found in table one of Appendix A.

Our attempt to draw from several conceptual frameworks does bring with it a certain amount of theoretical "noise". For example, while the occupational and the educational composition of school districts can easily be thought of as "human resources" of these districts, the income variable presents more of a problem. Income could just as easily have been categorized as a "fiscal characteristic", indeed as another measure of "fiscal ability". We solved this, at least in our own minds, by thinking of income in the sense of "income earning power" and therefore a "human resource" rather than simply another fiscal characteristic. Orthodox economists might have some difficulty in placing a "flow" notion such as income in the same category with a "stock" notion such as educational composition. Sociologists might have some misgivings about taking income, education, and occupation together without attempting to establish a causal or "path analysis" ordering among these variables. All these concerns are legitimate, but are perhaps of somewhat greater interest to the social scientist than to the researcher in educational administration.

The conversion of social and economic information by census tracts to information by school districts was, undoubtedly, the most tedious and difficult part of this study. It usually involved the overlaying of census tract maps with school district maps. This would have been a fairly simple task had the census tract boundaries been coterminous with the school district boundaries. Since in most metropolitan areas they were not we had to resort to some visual approximations. However, considerable care was taken in order not to have wide discrepancies in these visual approximations. Visual approximations have proven in other studies to be fairly reliable when contrasted with other techniques (Garms, 1967). Different solutions to this omnipresent problem of non-coterminous reporting units have been presented by Fisher (1967) and by Franklin (1969). Tables indicating the number of whole and fractional census tracts present in each of the school districts used in this study can be made available to interested researchers upon application to the project director. These tables can, of course, be used to convert many kinds of census data into school district terms.

1.3 The Samples

The five metropolitan areas utilized in this study were: Boston, Chicago, Cleveland, Detroit, and St. Louis. In the case of St. Louis both the Illinois and the Missouri portions of the area were used. In the other four cases the areas all fell within the boundaries of a single state. Each of the five metropolitan areas was regarded as a sample which had been measured at two points in time, 1950 and 1960. Matters of data comparability shaped somewhat the composition of the samples, for example, a district must have been tracted in 1950 to be included in the sample. Another factor that limited the number of school districts used was the change of status of some districts. Some school districts in 1950 were operating as elementary districts (K-6 and/or K-8) then were converted into K-12 in 1960. These school districts were not included in the samples since they could not be compared at two points in time. With these limitations the samples had the following N: for Boston, 72 districts; for Chicago, 28 districts (all high school); for Cleveland, 29 districts; for Detroit, 23 districts; for St. Louis, 23 districts.

Given the above description of the samples it is apparent that the term "suburban" cannot be given a very elegant theoretical meaning in this study. As in much other work conducted from an urban ecological focus we simply used an "ad hoc" definition and must, therefore, accept all the limitations attached to that kind of a definition (Hadden, 1969). While the conceptual problem in using the term "suburban" is perhaps not as great in administrative research as in certain kinds of sociological research, the "ad hoc" definition must, nevertheless, be kept firmly in mind. This is especially true since the definition of "suburban" establishes the distribution upon which the statistical computations will take place and therefore different definitions of "suburban" will result in different parameters. "Suburban school districts" are, for the purpose of this study, defined as all school districts in a given standard metropolitan statistical area which were tracted by the Bureau of the Census in its 1950 census of population except the central city school district in each of the five SMSA's studied. When looked at from the perspective of the 1970 census the school districts in this study might well be thought of as the "near" or "inner" suburban districts of the five metropolitan areas studied. Degrees of "suburbia", or where "suburbia" ends and "exurbia" begins is a matter of considerable controversy among urban researchers (Gibbs, 1961).

The unit of analysis in this study is the school district with K-12 jurisdiction with the exception of the Chicago metropolitan area. In the Chicago area a dual district organizational structure prevails and it was necessary to use only the high school districts. The mixture of different units of analysis is regrettable and caution should be exercised in comparing the Chicago area results with the data from the other four metropolitan areas. It is obvious that for some fiscal variables mixtures are not logical, for example, the per pupil expenditures of high school districts are quite different than the per pupil expenditures of elementary districts. It is not so obvious, but nonetheless true, that different ecological units also cannot be mixed (Cartwright, 1969; Duncan, Cuzzort, and Duncan, 1961). For example, descriptive statistics computed on individual school attendance areas will not correspond to descriptive statistics computed on school districts which are made up of these individual attendance areas. It is also true that statistics based on individuals or families cannot be compared with statistics based on communities, neighborhoods, or school districts made up of these individuals and families unless appropriate weightings have been applied in the aggregation process. Thus trends based on an analysis of unit districts (K-12) cannot be reliable predictors of trends among either elementary or high school districts. This troublesome methodological point must be kept in mind when interpreting some of the findings of this study. For example, trends with regard to income may give one reading when the unit of analysis is the school district, and a quite different reading when the unit of analysis is the household or the individual. It should also be noted that since these are unweighted school districts, the district with the smallest student enrollment in the metropolitan area has an equal opportunity to affect the parameters of the distribution as does the district with the largest student enrollment, except for the central city district which was excluded from the study.

2.0 INEQUALITIES WITHIN METROPOLITAN AREAS

In this section the focus shall be upon entire metropolitan areas and therefore movements toward either equality or inequality will be observed metropolitan area by metropolitan area. In the section immediately following the focus shall be upon sectors, clusters, or groupings of school districts within metropolitan areas, and the problems of parity or disparity posed by these individual districts and groupings of districts. To put the notion in the terms of the urban ecologist, one may think of this first section as dealing with the overall areal dispersion of social and economic variables, and the next section as dealing with spatial patterns and configurations that can be observed within each metropolitan area.

2.1 Previous Research

The study of the areal dispersion of social and economic variables in metropolitan regions is one of the oldest activities of sociologists, economists, political scientists, and some researchers in educational administration. A new interest may have been kindled in this traditional activity by a few local public finance and urban ecological studies which appeared in the early 1960's. These studies took the important step of focusing not upon socio-economic dispersion at one point in time, but upon the much more important question of trends in socio-economic dispersion with the passage of time.

Among the local public finance studies, the one by Burkhead (1961) must be considered as seminal. Burkhead hypothesized a condition of increasing fiscal "homogeneity" with respect to such characteristics as expenditure, ability, and tax effort for governmental units within the major metropolitan areas of the United States. He further believed that his empirical study of the Cleveland area supported this hypothesis. However, as Riew (1962) later pointed out, the Cleveland data did not actually provide clear and unambiguous support. A second study would be that by Curran (1963, 1966) of the governmental units in Milwaukee County from 1920 to 1960. Again, the results did not completely support the hypothesis of increasing similarity especially with regard to the fiscal ability variable. A third study by Liebman and Others (1963) is noteworthy in that it added variables designed to measure "social status" and thus provided something of a bridge between the economic and the sociological studies. Further, there is a suggestion in the Liebman data that the "social status" variables might be experiencing increasing heterogeneity rather than increasing homogeneity. Netzer (1966) summarizing these studies and others concludes that the hypothesis of increasing fiscal homogeneity has, thus far, been only partially supported.

Given the long history of the study of metropolitan spatial configurations by the so-called "Chicago School" of sociology, one might have expected to find quite a number of longitudinal socio-economic studies. We have not found this to be the case. A study by Lazerwitz (1960) using a concentric zone procedure did find evidence of increasing socio-economic heterogeneity in a number of metropolitan areas between 1950 and 1956. More revealing is a study of Schnore and Pinkerton (1966). These investigators found an increasing educational disparity between the central city and its suburban ring during the decade of the 1950's. This increasing disparity was registered by approximately 60% of a population of 363 metropolitan areas in the

United States, primarily in the older and larger metropolitan areas. Educational researchers have, as yet, not accumulated much of a record in this type of investigation. Havighurst's study of socio-economic distance between Chicago and its suburban ring can be cited (1964), as can the study of socio-economic trends in the Boston area 1950-1960 by the senior author of this monograph (1967a).

2.2 Hypotheses

On the basis of the research cited above we established the following hypotheses:

H1: With the passage of time suburban school districts have become significantly more homogeneous with respect to certain fiscal characteristics.

H2: With the passage of time suburban school districts have become significantly more heterogeneous with respect to certain socio-economic characteristics.

In the above hypotheses the terms "more equal" and "less equal", "toward parity" and "away from parity", and perhaps even "more segregated" and "less segregated" can be used with but slight damage to the logic. Statistically speaking, we are concerned here simply with the dispersion of a set of measurements at two points in time. "Significant" has its usual statistical meaning and we report findings at both the .01 and the .05 levels.

The basic notion of "dispersion" can be expressed by several mathematical models. The "Gini Index" or "concentration ratio" was used by the senior author in a previous study (Hickrod, 1967a). The "Gini Index" expresses dispersion in terms of the average of all possible differences among individual measurements in a distribution. Other models are based on the notion that dispersion can best be described in terms of the so-called, "interquartile range". While both of these models have their strengths, they also have a considerable weakness in that they cannot be easily subjected to inferential testing. Since we wished to apply a test statistic to the data, we have selected the simple variance as our model of dispersion.

The principal concern of this section is to determine whether the same subjects change in variability with regard to some characteristic features with the passage of time. Further, we know that some correlation can be expected to exist between the features in question from the first point in time to the second. These concerns lead us to select the "t test on correlated variances" (McNemar, 1962). This test statistic is described in part A of table fifteen. Since the variance for the second point in time is always taken first, a positive value for "t" will indicate a movement toward homogeneity. The use of these directional signs greatly facilitates the interpretation of the data in table two of Appendix A.

2.3 Findings

Before stating the principal findings certain limitations of the design should be emphasized. In the first place this is a study of only one decade and there is some reason to suspect that movements toward parity or disparity can vary greatly from decade to decade. In the second place while representatives of some of the older and larger metropolitan areas of the East and Midwest are represented the design does not include representative metropolitan areas from the South and West. Brazer (1967) has shown that metropolitan areas vary greatly by region with regard to social and economic disparities. Finally, the use of the variance requires the acceptance of the risk that a few extreme measurements may have greatly affected the "t" tests through their effect on the magnitude of the variance. Use of the interquartile range would have avoided this limitation.

Within these limitations table two of Appendix A supports the following statements. The second hypothesis, that is, that school districts are becoming more heterogeneous, or more unequal with regard to "social status" or "human resources" is supported strongly. This is especially true with regard to the income variable. School districts, at least in these five metropolitan areas, were undoubtedly more unequal in income in 1960 than they were in 1950. We were able to give much more support to this hypothesis than was possible in the case of a study of the Boston metropolitan area alone which the senior author conducted previously (Hickrod, 1967a). The only possible qualification might be that the evidence for the variable "percentage college educated" is somewhat weak in that three of the "t" values, while in the right direction, are not significant at the .05 level. The single most striking facet of the data in table two must be the increasing income inequality.

The first hypothesis presents a number of problems. On the whole we would have to say that the hypothesis of increasing fiscal homogeneity is not supported. In the case of expenditures the trend appears, in fact, to be in the other direction, that is, school districts became more unequal with regard to expenditure levels with the passage of time. However, this was not true for Chicago and the finding for Cleveland is not significant at the .05 level. With regard to effort it also appears that the school districts became less alike with the passage of time, however, two of the "t" values are not significant at the .05 level. The most disappointing aspect of the study was the ambiguous results obtained on the property valuation data. For three areas, Boston, Chicago, and St. Louis, the hypothesis of increasing fiscal homogeneity receives very mild support, but for Cleveland and Detroit the trend appears to be in the opposite direction. The finding for Cleveland does square with the results of Burkhead's analysis, as Riew pointed out, but it does not support the general hypothesis.

2.4 Conclusions and Speculation

School districts which are "balanced" or "heterogeneous" or "comprehensive" with respect to their socio-economic climate are thought to be desirable by some educators (Conant, 1964), by some social planners (Gans, 1968), and by some sociologists (Coleman, 1966). It is therefore noteworthy that the evidence presented in this study suggests a trend through time away from this desideratum, that is, many of our metropolitan school districts appear to be becoming more socio-economically alike internally, but less socio-economically alike externally. This trend was accurately predicted some eight years ago by Professor Robert J. Havighurst on the basis of a very limited amount of data then available to him (1961). Professor Havighurst has since speculated broadly upon the educational implications of this ecological trend (1966). It is regrettable that the persistent belief in "balanced" or "heterogeneous" or "comprehensive" school districts has remained more of a matter of an unexamined value premise than it has been the subject of empirical study. We have had a large body of sociological research which has stressed the great explanatory and predictive power of school and/or school district socio-economic climate for the educational achievement of students. This body of sociological literature has been summarized elsewhere for students of educational administration (Hickrod and Hubbard, 1969). However, most of this research has been conducted from a strategy which stresses the dominant socio-economic influence present in a particular school or school district. It would be useful to have some research which explores the impact of various socio-economic mixtures of pupils on different kinds of educational outputs.

With respect to the two major hypotheses tested in this section we have these suggestions. It is possible that the hypothesis of increasing fiscal homogeneity is simply too holistic in nature. The forces affecting the dispersion of property valuations are not necessarily identical with the forces affecting the dispersion of either tax rates or expenditure levels. It might be more useful to formulate an hypothesis for each of three major dimensions of school finance, that is, expenditure, effort, and ability, and then test these hypotheses using various operational definitions of the three concepts (Kelly, 1968). A task of sizable proportions yet to be accomplished is the establishment of the relationship between the maturity of a metropolitan area and the disparity observed in that area with regard to both the socio-economic and the fiscal variables. Cross-sectional work by Schnore (1967) has established some of these relationships for central city versus suburban disparity using socio-economic variables. However, there has been very little work done of a longitudinal nature and even less which uses a metropolitan wide focus as opposed to the central city versus suburban ring design.

For students of educational administration who are interested in the more egalitarian aspects of education this section must present a bleak vista, indeed. In the first place if we can assume that there is at least some relationship between expenditure per pupil and the level of service or "quality" of education offered students (Swanson, 1967) then the trend may be in the direction of greater inequality in either service levels or "quality" of education. It should also be noted that if one of the major purposes of grants-in-aid to equalize either tax burdens or expenditure levels then these grant systems have failed to achieve that purpose for the metropolitan areas studied here. The only ray of hope comes from the suggestion in the data of an increasing equality of property valuations, but this slight glimmer is quickly dashed by the contradictory nature of the findings between metropolitan areas. Advocates of school consolidation and reorganization will surely find little cheer in the increasing socio-economic inequality among these school districts. This is particularly true since a recent empirical study has highlighted the resistance of upper socio-economic suburban citizens to most forms of school reorganization (Zimmer and Hawley, 1968).

Policy makers at the state level should be interested in the fact that we have an increasing equality of property valuations, at least in some metropolitan areas, concomitant with an increasing inequality of income for all metropolitan areas. Since property valuations constitute the sole measure of fiscal ability in many grant formulae, we have the distinct possibility that many state departments of education have been awarding funds for education on the basis of a variable which is tending toward parity with the passage of time, while ignoring other variables which are tending toward disparity with the passage of time. As we shall see in section six of this study the failure of state governments to take into consideration any measure of fiscal ability other than property valuations has seriously weakened any claims toward "equalization" that might be advanced in behalf of many grant-in-aid systems. State officials should also be quite interested in the strong implication of increasing socio-economic "de facto" segregation that is contained in table two.

3.0 SPATIAL PATTERNS WITHIN METROPOLITAN AREAS

This section will analyze and describe, with the aid of the maps presented in Appendix B, the patterns and configurations of two wealth variables, i.e., median family income and assessed property valuations in the five metropolitan areas studied. Maps were constructed for both 1950 and 1960 and we are concerned here, as elsewhere in this project, with shifts in these variables during the decade studied. In this section no hypotheses were established and only limited prior research was referred to since our research posture was primarily descriptive rather than hypothetico-deductive.

3.1 Methods Employed

Rank orders of both income and property valuations were established for each metropolitan area for 1950 and 1960. Quartiles were then determined and each quartile was assigned a different tone shading as follows:

▓	Wealthiest Quartile
▒	Next Wealthiest Quartile
░	Next Poorest Quartile
(No Shading)	Poorest Quartile

These tone shadings were then applied to the maps. One caution should be observed here. The poorest quartile is perfectly white and the central city school districts are also white. However, it will be recalled from section one that central city school districts are not a part of this study, therefore the white color of the central city district does not indicate that it is in the poorest quartile. This process resulted in twenty maps, four for each of the five metropolitan areas. The number and title of the maps are as follows:

Map 3.1a: Boston - On Median Family Income, 1950
Map 3.1b: Boston - On Median Family Income, 1960
Map 3.1c: Boston - On Property Valuation, 1950
Map 3.1d: Boston - On Property Valuation, 1960

Map 3.2a: Chicago - On Median Family Income, 1950
Map 3.2b: Chicago - On Median Family Income, 1960
Map 3.2c: Chicago - On Property Valuation, 1950
Map 3.2d: Chicago - On Property Valuation, 1960

Map 3.3a: Cleveland - On Median Family Income, 1950
Map 3.3b: Cleveland - On Median Family Income, 1960
Map 3.3c: Cleveland - On Property Valuation, 1950
Map 3.3d: Cleveland - On Property Valuation, 1960

Map 3.4a: Detroit - On Median Family Income, 1950
Map 3.4b: Detroit - On Median Family Income, 1960
Map 3.4c: Detroit - On Property Valuation, 1950
Map 3.4d: Detroit - On Property Valuation, 1960

Map 3.5a: St. Louis - On Median Family Income, 1950
Map 3.5b: St. Louis - On Median Family Income, 1960
Map 3.5c: St. Louis - On Property Valuation, 1950
Map 3.5d: St. Louis - On Property Valuation, 1960

The individual school districts are also numbered and therefore can be separately identified. These codes appear at the end of Appendix B. For all maps the top of the map is North.

3.2 Findings: General Patterns

The maps reveal two general trends. In the first place there was a general shift of income from the central part of the metropolitan area to its outer parts. No such trend is clearly visible for property valuations, they remain scattered throughout the metropolitan area. In the second place a sector of affluent school districts (high on both income and property valuations) and a sector of disadvantaged school districts (low on both income and property valuations) is visible in both the Boston and the Chicago metropolitan areas. In the Boston case the disadvantaged area lies north of the central city and stretches up along the Atlantic coast while the advantaged area lies west of the central city. In the Chicago case the advantaged area lies north of the central city while the disadvantaged lies in a generally southern direction. There are some elements of sector formation in the other three metropolitan areas but none are as clear as the Boston and Chicago situations. Sector formation in the Boston area was noted in a previous study (Hickrod, 1967a).

3.3 Findings: Specific Metropolitan Areas

In the case of Boston, map 3.1a shows that in 1950 clusters of districts high in income could be found scattered around the central city. In 1960, however, an outward shifting of the variable is observable. The shift tends to have taken place more drastically north of the central city as indicated in map 3.1b. This can be seen by the drop in status of the following districts into the lower quartile: Somerville (50), Medford (30), Malden (26), Everett (16), Revere (45), Winthrop (66), and to the west, Brookline (6). At least in terms of income these districts can be said to be moving toward a disadvantaged status. Other districts moving into income disadvantagement in the north are Lynn (24), Salem (47), and Waltham (56). The income shift also created a pocket of advantaged districts in the west which includes Acton (69), Concord (12), Lincoln (23), Lexington (22), Belmont (3), Winchester (65), Weston (61), Wayland (58), Sudbury (52), Wellesley (59), Needham (36), Dover (15), Westwood (62), and Sherborn (72). In terms of property valuations map 3.1c shows pockets of disadvantagement both north and south of the central city and clusters of high property valuations in the west. By 1960, the property valuation shifts seem to have resulted not in sectors, but in a concentric zone formation. The central zone is mixed with both high and low valuations, the second zone is high on valuations, particularly so on its western side, and the third and outer zone is low on property valuations.

The Chicago maps reveal that the outward income flow has been mostly toward the north, very moderately toward the west, and very slightly toward the south. This is quite different from the Boston area where the north has moved in a disadvantaged direction rather than an advantaged direction. During the decade of the 1950's an advantaged sector formed in the north consisting of the following school districts: Mount Prospect (13), Glenbrook (19), New Trier (4), Skokie-Niles (17), and Park Ridge (8). On the other hand this same decade saw the emergence of a disadvantaged sector in the south consisting of Oak Park (1), Cicero (2), Argo (15), Oaklawn-Reavis (18), and Calumet (14). Of interest are districts like: Evanston (3), Waukegan (27), and Lake Forest (28) in the north, and Lemont (11), Blue Island (16), and Harvey-Thorton (6) in the south. They do not appear to have profited much from the outward flow of income during this decade. However, the districts in the north are high on property valuations while the districts in the south are frequently truly poor, that is, they have neither income nor property valuations.

Map 3.2c shows that in 1950 districts high in property valuations can be found in the north and in the outer west. In 1960 the pattern has changed. Districts high in property valuation are now found bordering the central city to the north and to the mid-west. The southern portion of the area does not seem to have been affected by property valuation shifts with the exception of Chicago Heights (7) which moved from the lowest quartile to the second quartile. It is of interest to note that much of the property valuation shifts took place in the western part of the area. Some districts that were previously high dropped a quartile or two. In this category are Wheaton (23), Glen Ellyn (21), Elmhurst (22), and Bensenville (25). On the other hand some districts low in valuation moved up a quartile or two such as Hinsdale (20), La Grange (5), Oaklawn-Reavis (18), Cicero (2), and Oak Park (1). Two districts worth special mention are Park Ridge (8) and Riverside-Brookfield (9). Both have remained low in property valuations despite shifts in neighboring districts. In terms of income both are relatively high. This appears to be accounted for in terms of a policy which banned the entry of industrial valuations into predominately residential areas.

The income patterns are not as distinct in the Cleveland area as in the previous two areas. The income flow appears to have resulted in both eastern and western affluent concentrations. Map 3.3b shows that an eastern concentration consisting of Shaker Heights (23), South Euclid (25), Orange (20), Chagrin Falls (6), Solon (24), and Mayfield Heights (16) has emerged, while at the same time a western concentration consisting of Bay Village (1), Westlake (27), Rocky River (22), and North Olmstead (17) has congealed. Pockets of income disadvantagement have appeared in the southeastern and northeastern parts of the metropolitan area. In the southeast are the income poor areas of Cuyahuga Heights (8), Garfield Heights (12), Maple Heights (15), and Bedford (2). On the northeast side are Wickliffe (28), Euclid (10), and East Cleveland (9). In terms of property valuations very little shifting took place. Districts high tended to remain high and districts low tended to remain low. Of particular interest are two districts, Garfield Heights (12) and Maple Heights (15). These districts are low on both wealth measurements but are surrounded by districts high in property valuations.

Like Cleveland, the Detroit area shows no single sector of affluence. There are, however, two pockets of income disadvantagement arising in the south and in the north. In the south this area consists of school districts: Ecorse (6), Wyandotte (23), and Lincoln Park (16). In the north it is made up of Hazel Park (11), Fitzgerald (7), and Van Dyke (22). While it is difficult to map general income flows in this area certain school districts have increased their income status greatly. For example, Livonia (17) and Grosse Ile (9) were in the second and first quartile respectively in 1950, but both moved to the highest quartile in 1960. On the other hand three districts that have remained in the lowest income quartile are Highland Park (12), Inkster (13), and Ecorse (6). Highland Park is in the heart of Detroit City, Inkster is in the southwest and Ecorse is in the south. As in Cleveland there is general stability of property valuations. Five districts have remained in the poorest property quartile. Two districts, Madison Heights (18) and Rosenville (20) are in the north, and three districts, Redford Union (19), Garden City (8), and Inkster (3), are in the west.

Without doubt the most striking observation in the St. Louis metropolitan area is the affluence of the Missouri portion, and the poverty of the Illinois portion. Inspection of maps 3.5a and 3.5b shows an income flow from the center outward in all directions except to the eastern (Illinois) portion of the area. Districts showing income losses are Ritenour (15), Normandy (13), Jennings (8), Maplewood-Richmond (11), and Clayton (5). One very interesting little district in the north is Kinlock (9). Despite shifts on all sides it has remained low on both income and property valuations. A further investigation revealed that this was a suburban black ghetto, i.e., 90% non-white and devoid of industry. What the Illinois side lacks in income it makes up in property valuations. There is a problem here, however, that does not enter into the interpretation of any of the other metropolitan area data. Assessment practices are not the same in Missouri as in Illinois and therefore the comparability of the property valuation figures is suspect. St. Louis is the only metropolitan area in the study that does not lie wholly in a single state. With this reservation in mind pockets of high valuations are found on the Illinois side in Venice (21), East St. Louis (22), and Lovejoy (23). On the Missouri side there is a larger concentration in Maplewood-Richmond (11), Brentwood (4), Clayton (5), University City (17), Welston (20), Normandy (13), Berkeley (3), and Jennings (8). A cluster of low valuation districts can be found consisting of: Kirkwood (10), Webster Grove (19), Affton (1), Bayless (2), and Hancock (7).

3.4 Conclusions and Speculation

A fuller interpretation of the findings of the first section is now possible. The map study indicates that the increasing income inequality has been brought about by a general outward drift of income from the center of the metropolitan areas. No such distinct movement of property valuations was observed and thus the inconclusive results regarding property valuations as related in the first section are also supported by the map study. We can further see that this income flow has resulted in the formation of large sectors of advantaged and disadvantaged school districts in two of the five metropolitan areas. In the other three metropolitan areas it appears to have resulted not in single large sectors of advantagement and disadvantagement, but rather in clusters of advantaged and disadvantaged school districts distributed throughout the metropolitan area. Three major spatial "theories" have been put forward by urban ecologists, i.e., the Burgess concentric zone notion, the Hoyt sector conception, and the Harris and Ullman multiple-nuclei formulation (Gist & Fava, 1964). It would seem that either the Hoyt sector conception, or the multiple-nuclei system, would be most useful in describing the spatial distribution of wealth among school districts in metropolitan areas. There does not seem to be as much support for the concentric zone notion. It must be admitted that it is rather unfair to use these schemes to describe metropolitan distributions since they were primarily intended to describe spatial patterns within the limits of a single central city.

In a general sense the data suggests that during this decade human resource migration resulted in either (a) large sectors, or (b) smaller clusters of contiguous school districts that were alike with regard to income. This probably occurred also with regard to income related variables, such as education and occupational composition, although we did not subject these latter variables to cartographic analysis. If this is the case then it holds some serious implications for school reorganization and consolidation. It is apparent, for example, that to organize larger districts in either the Boston or the Chicago metropolitan areas would result primarily in merging wealthy districts and merging poor districts. Thus consolidation and reorganization in these metropolitan areas would do little to reduce resource inequality. In the other three metropolitan areas the results of reorganization might be somewhat more equalizing but the same tendency of like socio-economic school districts to be found side by side is still present, although on a somewhat smaller scale. It must be granted that reorganizations are not so likely in suburban areas as in rural areas since the schools are, with some exceptions, already of appreciable size. This is not to say that a consolidation with an equalizing effect could not occur somewhere, even in the highly segregated Boston and Chicago metropolitan areas, but it does cast doubt on school reorganization as a primary tool for equalizing resources in suburban areas. Consolidations and reorganizations in rural or semi-rural areas are quite another matter.

Two final observations might be made. First, purely on the basis of inspecting the maps it is obvious that the correlation between the two forms of wealth, income and property valuations is not particularly strong. Frequently districts are found which are high on property valuations but low on income and there are also numerous examples of districts that are relatively low on property valuations but relatively high on income. Further information on this matter will be provided in section six. Secondly, it is apparent that having the property valuations undifferentiated in terms of industrial, commercial, and residential is a serious limitation on the analysis. For example, we happen to know that the school districts of Cuyahuga Heights in the Cleveland area and Everett in the Boston area have heavy concentrations of industry. It is interesting to note that these school districts are surrounded by low income and in some cases low property valuation districts. In other words, these industrial enclaves are surrounded by workingmen's bedroom suburbs. These bedroom suburbs are particularly hard put to support educational services since they have the children to educate, but do not have the industrial valuations that go along with the concentrations of low wage labor. This phenomena of the plant being in one school district, while the family is in another school district produces many stresses and strains in metropolitan areas. Further commentary on this problem will be found in section five.

4.0 DETERMINANTS OF SPENDING FOR PUBLIC EDUCATION

Thus far the discussion has centered on the first of the three basic research questions posed in part one. We now turn to the second question and ask what effects the disparities observed in the two previous sections have on public education? There was a wide choice here. It might have been possible to observe the effects of this social and economic disparity upon the educational services that are provided in the various school districts. This would have resulted in a study of the determinants of the "processes" of education. With much greater effort it might have been possible to mount a study of the "products" of education, i.e., an "input-output" study along the lines indicated by Thomas (1962, 1964) and by Burkhead and others (1967). Both of these activities would have cast some light upon the ancient "cost-quality" questions ask by literally generations of researchers in school finance (Swanson, 1967). Due to both the availability of data, and to our limited time and funds we chose rather to look at the effects of socio-economic disparities upon the level of financial support for education. This choice committed us to reviewing a rather sizable amount of previous research. We have organized this review in a chronological manner, beginning with the earlier studies and bringing the record forward to what was available to us in the summer of 1969.

4.1 Previous Research

In the last ten years a considerable amount of literature concerning the determinants of educational spending by local school districts has emerged. Our review of the literature for this portion of the study revealed no less than sixteen studies dealing with this subject. These studies have been conducted both by economists and by school finance specialists. Until 1967 these studies were cross-sectional, that is, conducted at one point in time. Since 1967 at least three longitudinal investigations have been published. The theoretical framework from which these investigations are conducted is a very important matter. However, our brief review of these studies which follows will concentrate only on their most prominent empirical findings. Readers interested in the theoretical background are referred to the seminal work at Stanford by James (1963) and to a recent doctoral dissertation at Chicago by Fisher (1967).

Keynoting this decade of research was the study of forty large cities in the United States by Brazer (1959). Brazer was able to explain 41 per cent of the variation in per capita current educational expenditures in these large city school districts. His best predictors in order of their importance were: (1) median family income, (2) average daily attendance, (3) state aid received. This investigation was closely followed by Hirsch's exploration of the determinants of current operating expenditure among the twenty-seven districts of St. Louis County, Missouri (1960). Hirsch's model was much more effective than Brazer's and explained 85 per cent of the variation in local expenditures. Hirsch's predictors in order of their importance were: (1) property valuations, (2) an index of quality, (3) per cent of secondary students, (4) size entered in quadradic form. This model is interesting in a number of respects. In the first place it attempted to hold quality constant while investigating the determinants of expenditure. To our knowledge no other expenditure model has attempted this. Secondly, with the exception of the Hickrod study of Boston, it is the only model which looked into the possibility of curvilinear relationships among the variables. Thirdly, it was a study of a single metropolitan area and it set the stage for a number of other metropolitan studies which have appeared since that date. In 1961 Sacks and Hellmuth included an expenditure model as a part of their extensive study of finance in the Cleveland metropolitan area. For thirty-two school districts in Cuyahoga County, Ohio, they were able to explain 87 per cent of the variation in current operating expenditure per ADA. Their leading predictors in order of importance were: (1) an Ohio intangibles levy per ADM, (2) state aid per ADM, (3) property valuations per ADM.

The year 1963 saw the publication of two very important studies based on national samples. At Stanford, James, Thomas, and Dyck explored a model with data from five hundred and eighty-nine school districts located in ten states. This model predicted 77 per cent of the variation in per pupil current operating expenditure. The predictors in order of their importance for these researchers were: (1) median family income, (2) property valuations, (3) percent unemployed (negative), (4) percent rural (negative), (5) owner occupied homes (negative). Miner (1963) used an even larger sample, some one thousand seven hundred districts located in twenty-three states. Since Miner used many regression models it is even more difficult to describe this study in a sentence or two than it is with other studies. Certainly one of the important contributions of the Miner study was the use of per pupil expenditures from local tax sources as the dependent variable rather than total current expenditure per pupil. This is particularly important in models that use state aid as an independent variable. Failure to do this will introduce autocorrelation into the model which will tend to overstate the importance of the state aid variable. In one of Miner's equations, the one for the state of Massachusetts, he finds these variables to be predictive: (1) percent of students in high school, (2) percent of employees in auxiliary services, (3) median family income. Miner's efforts point out the difficulty of using single equations with many variables to describe the process by which local expenditures are determined. Mixing both supply and demand elements in the same structural model makes interpretation difficult. Regardless of their difficulties, however, there is no doubt that these two studies, the Stanford study financed by the United States Office of Education, and the Syracuse study financed by the Carnegie Corporation, did more to stimulate econometric model building in the school finance area than most of the other efforts. The year 1963 also saw the publication of one of the first state-wide studies, that by Sacks, Harris, and Carrol which utilized data from fifty-eight counties in New York State. This model using the county as the unit of analysis was quite powerful, attaining a predictive power of no less than 90 per cent of the variation in per capita current expenditure. The leading predictors for Sacks were: (1) per capita state aid, (2) property valuation, (3) per capita income.

An interesting departure occurred in an article published in 1966. Most expenditure determination models are constructed from economic and occasionally political variables. In that year, however, Alkin published the results of a model which utilized religious variables. Since the author was forced to work with only eighteen school districts in the San Francisco Bay area the model has only limited generalizability. Nevertheless, the model attained a respectable predictive power, explaining 69 per cent of the variation in current expenditure. Percentage Jewish emerged as a good predictor of local spending. One of the more interesting findings is that percent Catholic is positively, not negatively, related to local spending. As would be expected, the inclusion of the property valuation variables does tend to reduce the predictive power of the religious variables. In the preceding year, 1965, Kee published the results of a study based on data from thirty-six large cities. The model predicted 59 per cent of the variation in per capita expenditures and the leading predictors were: (1) income, and (2) average daily attendance. Contrary to findings by Sacks, Kee does not find the amount of state aid received to be much of a determinant of local spending.

1967 was a most productive year for this type of research in that five studies appeared, three of them cross-sectional and two of them longitudinal in design. Garms reported on later studies carried out at Stanford. A model based on data from one hundred and seven districts of over 25,000 successfully explained 85 per cent of the variation in current expenditure per pupil. The predictors in order of their importance were: (1) percent of labor force unemployed (unexplainably positive), (2) median family income, (3) percent home owners (negative), (4) median years schooling, (5) property valuations per pupil, (6) percent attending private schools. Perhaps the greatest interest in this study lies not in what did emerge as successful predictors, but rather in what failed to predict at a satisfactory level. Some favorite variables from administrative mythology, e.g., appointed versus elected boards, fiscal dependence versus fiscal independence, and dual business manager-superintendent administrative structure versus sole superintendent fiscal management, all failed to have any effect on what was spent at the local level. A study also appeared in that year which shifted the focus from central cities to suburbs. Sacks and Ranney were able to predict 67 per cent of the variation in expenditures in suburban areas using (1) per capita income, (2) per capita state aid, (3) an enrollment ratio.

1967 also saw the completion of a doctoral dissertation at the University of Chicago which is as interesting for its methodology as for its substantive findings. Using forty-two high school districts in the Chicago SMSA Fisher explained 67 per cent of current expenditures from local tax sources. His predictors in order of importance were: (1) per pupil property valuations, (2) median family income, (3) federal and state aid per pupil. However, Fisher then used some sub-models with quite different results in terms of the order of the predicting variables. For example, for twenty-one higher income school districts the leading predictor is not property valuations, but rather the percent of adults with thirteen or more years of schooling. Similarly, in twenty-one residential as opposed to industrial districts, the three variables of property valuation, income, and education all have roughly equal predictive power. Fisher also did an analysis of residuals which cast considerable light on the deviant school districts in his sample. This dissertation is worthy of emulation.

The last two cross-sectional studies our search of the literature revealed were published in 1969. Ranney was able to explain 75 per cent of the variation in expenditures among thirty-seven large school districts. Of considerable interest is Ranney's leading predictor, expenditure outside the central city. Ranney was thus able to provide supporting evidence for the existence of the "demonstration effect" of which Benson has written. The expenditures of central cities are affected by the expenditures of suburbs which surround them. A doctoral thesis at Stanford by Harvey using different types of property valuations, e.g., residential, agricultural, and commercial was able to explain 66 per cent of the variation in expenditure among twenty-eight school districts in Santa Clara County, California.

As Miner (1963) pointed out it is difficult if not impossible to generalize from so many different kinds of regression models, each one containing different kinds of variables. However, a full decade of research indicates that at least three-quarters (75%) of the variation in local spending can frequently be predicted for any given set of school districts at one point in time. It is also notable that most of the important independent predictors are not controllable by school administrators. The level of funding is primarily determined by the wealth of the district. Income has been the best single predictor but in some cases it has been outdistanced by property valuations. Many researchers have had difficulty, in fact, in getting any variable to be significant after the income and property valuation variables have been allowed to operate. The cross-sectional research thus suggests a high degree of determinancy with respect to at least the level if not the quality of educational services offered any given community.

There have been two types of longitudinal studies. One type of study attempts to relate a change between two points in time in expenditure to a simultaneous change (that is a change occurring during that same passage of time) in other school district characteristics. Two studies published in 1967 were of this nature. Kee was able to explain 41 per cent of the change in expenditures between 1953 and 1962 for twenty-two large central city school districts. His best predictor was, not unexpectedly, change in median family income. What was unexpected was that change in per capita state aid had a negative sign, indicating that there may have been some substitution of state for local resources. At the very least one can say that there was no "stimulation" effect. Change measurements are of many different kinds (Duncan, Cuzzort, and Duncan, 1961). The type used by Kee was an "absolute change" which is simply the difference between the measurement taken at the second point in time and the measurement taken at the first point in time without regard to sign. Hickrod (1967b) was able to explain only 22 per cent of the change in expenditure levels for seventy-three school districts in the Boston metropolitan area. The change measurement used by Hickrod was a "percentage change" which is simply the absolute change divided by the measurement taken at the first point in time and multiplied by 100. One unexpected finding from this study was that the leading predictor was not income, or even property valuations, as might be expected, but rather the percentage change in the proportion of college graduates residing in the school district.

The second type of study is represented by the investigation of fifty districts in New York State by Hogan and Bentley (1969). These researchers were interested in exploring the constancy of the parameters in their prediction equations and thus they repeated the same model every year for five years, 1964 through 1968. The parameters did prove to be rather stable over this short five-year period and what is perhaps more interesting the degree of determinancy remained about the same. Multiple R squared (the coefficient of determination) for the five years was .86, .82, .84, .86, and finally .87. While it is hazardous to generalize from so small a group of studies, it appears that models based on simultaneous change do not indicate the degree of determinancy that cross-sectional models do. Before administrators jump to the tempting conclusion, however, that change in expenditure levels is not so determined as level of expenditure at a given point in time, it might be well to reflect that there have been no studies of lagged relationships. It may be that changes in resources precede changes in expenditure by some unknown number of years and it is only the simultaneous nature of the models that is reducing the degree of determinancy.

4.2 The Formal Model

The formal model used was linear, additive, and did not explore interactions. These must be considered limitations since there is empirical evidence that expenditure models can be curvilinear (Hickrod, 1967b) and one might reasonably assume that interaction effects are present. The high predictive power attained by other investigators, however, with these simple linear additive models probably justifies their continued usage. In standard notational form the model is:

$$X_1 = f(X_2) + f(X_3) + f(X_4) + f(X_5) + f(X_6)$$

Where:

X_1 = Expenditure per pupil

X_2 = Assessed Property Valuation per pupil

X_3 = Educational Tax Rate

X_4 = Percentage College Educated

X_5 = Median Family Income

X_6 = Occupational Index

Details concerning these variables are to be found in table one of Appendix A. Variable six, the occupational index, probably deserves special mention. This index is really a ratio of "white-collar" to "blue-collar" workers. It is computed by taking the proportion of "professional" plus "managerial" and dividing it by the proportion of "craftsmen" plus "operatives" in a given school district. The United States census of population gives detailed descriptions of these occupational categories. This particular ratio notion was taken from the census of population in the United Kingdom.

The design employed here uses both the repeated model procedure suggested by Hogan and Bentley, and the simultaneous change procedure used by Kee and by Hickrod. Three kinds of simultaneous change were used, e.g., absolute changes, percentage changes, and positional changes. Absolute and percentage changes have been previously described. A "positional" change is obtained by converting all measurements into standard scores, and then taking the difference between standard scores (Duncan, Cuzzort, and Duncan, 1961). All measurements were taken at two points in time, 1950 and 1960. Models based upon measurements taken only at two points in time are open to the possibility that either the first or the last measurement may be erratic and thus introduce a great amount of error into the measurements. In a sense these "two point" models are simply poor substitutes for a conventional time series.

The nomination of variables for this model was guided by the general form of demand or consumption models in economics. Demand or consumption functions usually consist of three parts. First there is the price of the product; second, the ability to pay for the product; and third, a mixed series of social variables which have been shown to predict the sale or consumption of the product (Ferber and Verdoorn, 1962). The last category of variables can be put forward either on the basis of previous research or on more theoretical and hypothetical grounds. Since we have no price variable in the public household, as opposed to the private household, we have nominated the tax rate for this role. Ability to pay for the product was specified in the form of taxable wealth, i.e., assessed property valuations. Our social demand variables were then operationally defined as three common measures of socio-economic status, e.g., income, education, and occupation. Obviously there are other ways to conceptualize these variables. For example, one might conceptualize income, education, and occupation, not as socio-economic status, but as measures of the "human resources" of a school district. These "human resources" could then be contrasted with "material resources" taken in the form of property valuations. One could also conceive of both property valuations and income as being measures of the single concept of "wealth", and education and occupation as "willingness to pay". One could also use the popular James categorical system and by treating tax rate as a budgetary or governmental variable, arrive at the trichotomy of wealth, demand, and governmental process. Since theory building is indeed "a deliberate enterprise" we must leave this important but time consuming task to others.

4.3 Findings

Most of the limitations on the findings expressed in section 2.3 apply here as well, especially those relating to the external validity of the study. As to the internal validity of the models, even the best of the cross-sectional models left twenty per cent of the variation in expenditure unexplained. Some of the change models were unqualified failures such as the model for Chicago which explained less than five per cent of the variation in expenditure change. On the whole, however, it appears that the models did include the most powerful predictors of both expenditure level and expenditure change, therefore the internal validity is generally acceptable. Perhaps the most serious weakness on the internal side lies in what confidence one can have in the order of determinancy found for the independent variables. Many statisticians would like to have at least twenty measurements for the proper identification of the relative importance of each independent variable. Only the Boston model has that many degrees of freedom. However, should this rule be strictly followed all but two or three of the sixteen studies cited in this section would have to be eliminated. Nevertheless given the limited degrees of freedom for all but the Boston model more confidence should be placed in the coefficient of determination (multiple R squared) than in the determinancy order as revealed by the step-wise regression procedure used. Finally, as in section 2.3 the reader should recall that there may be great changes between decades, and one cannot be sure that the relationships found in the 1950-1960 decade will necessarily hold for the 1960-1970 decade. Replication for different time periods and different metropolitan areas would be helpful.

Table three of Appendix A indicates the predictive power of the cross-sectional models. The most interesting item of information here is the increased determinancy between 1950 and 1960. In four of the five metropolitan areas educational expenditures are much more determined in 1960 by the independent variables than they were in 1950. A good deal of variation exists, however, between metropolitan areas. The models explain expenditure levels quite well in the Boston and St. Louis areas but less than half the variation is explained in the Chicago area. With the exception of the Chicago area, the models are working at about the level of predictive efficiency that previous researchers have obtained. Table four indicates the predictive power of the simultaneous change models. As expected, these simultaneous change models do not attain the predictive efficiency of the cross-sectional models. However, many of them do explain from half to two-thirds of the variation in expenditure changes. It can also be seen that the model which uses absolute changes attains better predictive power than either percentage changes or positional changes. The multiple R squared statistics in these two tables were obtained from a forward solution computer program which allowed all variables to enter the predicting equation.

Table five shows the order of determinancy for independent variables in the cross-sectional models. This determinancy order was obtained by a step-wise regression program with the abort level set at a 5% reduction of sums of squares. The Chicago model had to be set at the 1% reduction of sums of squares in order to get the program to take any variables. Only the first three predictors are shown even though in some cases the program allowed more than three variables to enter. There is not much of a pattern in the 1950 data. In three metropolitan areas there was only one variable with any amount of predictive power. However, by 1960 a pattern had emerged. Property valuations were the leading predictor of expenditures in three metropolitan areas and were the second best predictor in the other two metropolitan areas. However, a "social status" or "human resource" measurement, the occupational index, emerged as the best predictor in two areas and the second best predictor in two more areas. Tax rate and median family income fought out the third place position. An interesting phenomena was noted with regard to the sign of the tax rate variable. In three of the areas in 1950 it was positive and in all five of the areas in 1960 it was positive. This suggests two thoughts. In the first place our conceptualization of tax rate as a price factor is now open to question. Price normally exerts a negative influence on consumption, that is, as the price goes up, consumption comes down, ceteris paribus. However, this is apparently not the case for education. Secondly, tax "burden" must not exert the downward pressure on expenditures that "common sense" and taxpayers federations would have one believe. It should be noted that Hogan and Bentley also report positive, not negative, relationships between tax rate and expenditure. The income variable did not perform as well in these models as it has in other investigations. This may be due to the high intercorrelations between income and occupational index. When the occupational index comes in first, most of the effect of income is already accounted for.

Table six of Appendix A shows the order of determination of the simultaneous change models. Again property valuations and, less frequently, occupational index are the best predictors. However, expenditure change as opposed to expenditure level is apparently much more affected by changes in the tax rate. It will be seen that in the Boston models change in the tax rate is the best predictor through all three of the change models. Also, while proportion of college educated cannot get "into the money" in the cross-sectional race it does appear in the change models. With the exception of the models for Boston the standardized regression coefficients in these change models do not attain the statistical significance levels that are obtained in the cross-sectional models.

4.4 Conclusion and Speculation

The high degree of expenditure determinancy noted by many researchers on the basis of cross-sectional models is apparently of rather recent origin. The record indicates a striking growth in determinancy during the 1950's, and this increasing determinancy is disturbing. If this trend continued during the 1960's and 1970's until it reached, let us say, the 90 or 95 per cent level then one might have to seriously revise some notions of "leadership" in educational administration. Granted that fiscal leadership could still be exercised in the allocation of a given amount of funds, there would be very little left about the level of funding that could be affected by individual school administrators. If, of course, the administrator's control over the allocation of a given amount of funds is also decaying, through the onset of collective negotiations, then, at least in a fiscal sense, the administrator may no longer be able to exert "leadership". It is tempting to seize upon the lower rates of predictivity for the change models and interpret this as evidence that while the level of funding is not really affected by anything the administrator may or may not do, the change in the level of funding is not so nearly determined by environmental constraints. This may be the case. However, the simultaneous nature of the change models is suspect. It may very well take some time for resource changes in school districts to affect expenditure levels. If this is the case then we should explore expenditure change with time-lagged models. Until these time-lagged models are constructed and tested we cannot really be sure that administrative characteristics have any more affect on expenditure change than they do upon determining expenditure levels at a given point in time.

It would be very helpful to explore some models which contain administrator characteristics or administrative behavior variables as well as school district characteristics. Using incremental regression techniques, we could enter the environmental variables first, and then systematically observe the effects, if any, of the administrator characteristics or behavior on the level of funding. In this, as in other areas of current administrative research, it is not really very satisfying to quit the field with the findings suggesting that environment is almost everything and the actor of little importance. However, if the actor is as important as administrative mythology would have one believe, then it should be possible to demonstrate this empirically.

5.0 TYPES OF SCHOOL DISTRICTS AS DETERMINANTS OF EXPENDITURE AND EFFORT

In section four school district characteristics were represented in terms of continuous or interval scales. In this section we look at the determinants of not only expenditure, but also fiscal effort, treating school district characteristics as nominal or categorical measurements. As has been previously mentioned, the regression models used in section four did not allow us to explore the effects of interacting independent variables. The different statistical treatment used here will allow us to explore the interaction of two variables, income and property valuations, in explaining and predicting expenditure and fiscal effort.

5.1 Previous Research

There have been several attempts to analyze fiscal differentiation in metropolitan areas by means of typologies of municipal units. Unfortunately, it is quite difficult to compare these studies for at least five reasons. In the first place the typologies are not the same. For example, a sociologist such as Schnore (1965) may find the trichotomy of "employing", "intermediate", and "residential" to be useful for his purposes, while an economist such as Margolis (1957) may wish to speak of "balanced suburbs" and "business suburbs". Secondly, despite the increasing popularity of educational research among social scientists, the studies may or may not include educational spending. Thirdly, the studies may or may not attempt to add the amount of municipal overlap into their calculations of expenditure, fiscal capacity, and fiscal effort. Fourthly, while the operational definition of fiscal effort is usually the ratio of expenditures to fiscal ability, the definition of fiscal ability may be in terms of either property valuations or income. Finally, as was the case in section four, the previous research is based on widely different samples and populations.

Given the above design and definitional problems it is not surprising that contradictory empirical findings have appeared. For example, Margolis (1957) finds that "balanced" suburbs, that is suburbs having both industrial and residential valuations, exert greater fiscal effort in the San Francisco area than do "dormitory" suburbs. On the other hand, Brazer (1962) finds that "dormitory" or "residential" suburbs exert greater fiscal effort than do "balanced" suburbs in the Detroit area. James (1961), using the typology developed by Brazer, finds that industrial suburbs exert a high fiscal effort for education. However, Groves and Riew (1964) find that industrial suburbs in the state of Wisconsin exert low fiscal effort for education and the Sacks and Hellmuth study (1961) of the Cleveland area tends to support this finding. It is also notable that in both the Groves and Riew study, and in the Sacks and Hellmuth study, it is the residential suburb characterized by low property valuations that exerts the greatest amount of fiscal effort for education. With regard to educational expenditures there is more agreement among the studies than is the case with fiscal effort. Most of the studies indicate that higher expenditure levels for education are to be found in either (a) high property valuation residential suburbs, or (b) industrial suburbs. Given the degree of determinancy that property valuations have demonstrated with regard to expenditure, both in section four of this study and in other studies, this relationship would be expected.

5.2 Hypotheses

On the basis of the research noted above, and on the basis of the findings from section four, which was completed prior to this portion of the study, we established the following hypotheses:

H1: A categorical system constructed from dichotomizing at the median both income and property valuation measurements on a set of school districts will significantly discriminate between these school districts in terms of both expenditure and fiscal effort.

H2: This discrimination power can be demonstrated to have increased with the passage of time.

H3: High expenditures for education will be found in districts which are high on both property valuations and income, but they will also be high in districts which are high on property valuations and low on income (the "industrial" suburban school districts).

H4: The greatest fiscal effort for education will be found in districts which are low in both property valuation and income, but effort will also be high in districts which are high in income but low in property valuations (the "dormitory" or "bedroom" suburban school districts).

The first two hypotheses are fairly straightforward, but in the third and fourth hypotheses we can be found guilty of the same weakness in definition that haunts other research efforts conducted from a categorical or typological stance. For example, the term "industrial" may be a fair label for most districts which are high in property valuation and low in income. However, "dormitory" or "bedroom" suburbs could probably be found among districts which are low on both income and property valuations, as well as among districts which are low on property valuations but high on income. Also, "balanced" districts in the sense of having both industrial and residential valuations cannot readily be identified here since they will probably be mixed with the affluent residential districts that are high on both income and property valuations, and perhaps even among the top of the "dormitory" or "bedroom" category. Obviously a typology based on only the two dimensions of income and property valuations, and where the property valuations are undifferentiated between residential, industrial, and commercial valuations leaves much to be desired. A description of the variables is not needed at this point since they have been stated in sections one, two, and four, and further details are provided in table one of Appendix A. All limitations on the external validity of the study which apply to sections two and four also apply to this section.

5.3 Findings

Before referring to the findings as revealed in tables seven, eight, nine, and ten of Appendix A, the reader should be cautioned that direct comparisons of data between metropolitan areas cannot be made from these tables. For example, the higher per pupil expenditures for the Chicago metropolitan area are merely artifacts of using the high school district as the unit of analysis in this area while using the K-12 district as the unit of analysis in the other four metropolitan areas. Also, the tax rates cannot be compared since in the Boston area the rate used was not the legal rate but rather a substitute value computed directly from current expenditures and assessed valuations. Also, the units of measurement are not the same between states, some states use millage, others dollars on the hundred valuation, or on the thousand valuation, etc. This is awkward, but it presents no serious problem as long as the data from different metropolitan areas are never pooled. This is the situation in this study, not only due to different units of measurement, but also due to the fact that pooling the much larger N of the Boston area with the other areas would have caused the Boston relationships to swamp all the other relationships.

The first hypothesis is supported since tables seven and nine indicate three out of five significant F values for 1950 and four out of five significant values for 1960. Hypothesis two is also supported for expenditures since a comparison of tables seven and eight reveals higher F values for every metropolitan area in 1960 than in 1950 with the exception of the St. Louis metropolitan area. This fact also lends support to the major finding of section four, that is, the existence of a trend toward the greater determination of expenditure levels by resource levels in the school districts. However, hypothesis two is not clearly supported for tax effort. While it is true that one additional F value is picked up in 1960 over 1950, and the magnitude of two of these values rises from 1950 to 1960, it is also true that the value of the other three F's falls from 1950 to 1960. While the study is not designed to explore the determinants of tax effort, there is at least the suggestion here that increased determinancy may apply more to expenditure than to effort.

Hypothesis three appears to be supported. Examination of table eight reveals that the high property valuation - low income districts have the highest expenditure levels in three of the five metropolitan areas in 1960. Also, with the exception of the Boston area, the expenditure difference between the high income - high property valuation districts and the low income - high property valuation districts is not significant. Hypothesis four is also supported since table ten indicates that high income - low property valuation districts have the highest tax effort in three of the five metropolitan areas and in no metropolitan area is there a significant difference between the high income - low property valuation districts and the low income - low property valuation districts. These findings are in general agreement with the results obtained by Groves and Riew and by Sacks and Hellmuth in the research cited in section 5.1.

5.4 Conclusions and Speculation

The "industrialized" districts, or at least those districts that are high in property valuations and low in income, appear to live in a rather privileged world. In general, for the lowest tax effort in the metropolitan area these districts can attain the highest expenditures per pupil. In part, this is simply the empirical manifestation of "tax havens" which exist in all metropolitan areas. Industries may cluster together initially for the purpose of profiting from external economies of one kind or another or to profit from a particular kind of labor pool. However, in time the favorable property tax rates caused by this concentration of wealth begin to attract other industrial and commercial valuations to benefit from the sheltering effect created by these aggregations of property valuation. This situation has caused some school finance specialists (Benson, 1965; Thomas, 1968) to suggest that state governments might be well advised to go back into the property tax business from which they excused themselves around the turn of the century. The imposition of a state-wide property tax for educational purposes would modify greatly the privileged position of the industrialized districts. Many of these districts however are not privileged at all if the focus is switched to human resources, in fact, heavily industrialized school districts may have to keep their salaries up in order to attract personnel who are willing to work with children from lower socio-economic families in the shadow of the factories.

At the other end of the spectrum stand the "dormitory" or "bedroom" suburbs. In general, despite very great tax efforts these districts support education at only modest expenditure levels. Since these districts consist of middle class families that usually value education rather highly, their financial situation must constitute a constant source of frustration. Their lack of industrial or commercial valuations condemns them to modest expenditure levels which mean modest salary levels for teachers. However, these districts will usually be found to be rather well off in terms of human resources. On balance, it is difficult to say which of these two categories of school districts in the metropolitan area is better off, the industrialized district with no pressing financial difficulties, but with lower human resources, or the "bedroom" suburb that lives in a constant financial bind, but has more human resources with which to work.

6.0 THE IMPACT OF STATE AID

State aid is of sufficient importance that it deserves special treatment. The subject of state-to-local grants-in-aid for education is quite complex and the literature is very extensive. Almost all textbooks and readers in school finance give broad coverage to the topic (Burke, 1957; Johns and Morphet, 1960; Mort, Reusser, and Polley, 1960; Benson, 1963; Burkhead, 1964; Gauerke and Childress, 1967; Benson, 1968; Garvue, 1969). A number of studies conducted in, and usually on behalf of, particular states have also addressed themselves to the major policy question of an optimal or at least a satisfactory method of distributing funds to local school districts. Among the more well known are Massachusetts (Weinburg, 1962), Wisconsin (Peterson and Rossmiller, 1963), California (Benson and Others, 1965), Ohio (Binswanger and Others, 1966), Rhode Island (Benson and Kelly, 1966), Missouri (Thomas and Others, 1966), Michigan (Thomas and Others, 1968), and Illinois (McLure and Others, 1966; Hubbard and Hickrod, 1969). Frequently these studies review the strengths and weaknesses of various types of formulae, i.e., "foundation approaches", "percentage equalization", "resource equalizers" etc. The authors often assume that their task is to lay out policy alternatives for the legislature without necessarily recommending a "best" formula or a "better" distribution scheme. A series of trend-setting and ground-breaking studies directed by James at Stanford (1961, 1963, 1966) opened the path for the empirical investigation of the effects of state aid. It is a great pity that these fine empirical studies are out of print and not available to many educational researchers. Studies based on computer simulation of different types of formulae have also appeared (Farner and Others, 1968; Hempstead, 1969). This computer simulation approach in fact appears to be the "action research" frontier of school finance. Many state departments, state teacher organizations, school board associations, etc. are rapidly programming a number of different kinds of formulae into their computers and attempting to analyze the results.

The aspect of state-to-local aid we shall explore in this study is quite limited. We are interested here primarily in the question of whether there is some evidence that state grant systems may have had some effects that would offset or mitigate the trend toward greater human resource inequality among local school districts documented in section two. Thus we are interested in what school finance experts would call the "equalization effects" of the grant-in-aid systems. Since a portion of this study deals with the determinants of educational expenditure we are also interested in the effect state aid has on local school district outlays for education.

6.1 Previous Research

Research on the "equalization effects" or "equalization strength" of existing grant-in-aid systems is greatly hindered by two problems. In the first place there is no commonly accepted operational definition of "equalization" despite the fact that school finance specialists have talked about the concept for decades. To some it means the equalization of expenditure levels, to others the equalization of tax effort, and to still others the grander notion of equalizing educational opportunities. Probably to most it has something to do with the principle of distributing state funds in inverse relation to the "wealth" or "ability to pay" of a district. Unfortunately, there is also little agreement on an operational definition of "ability to pay". Present thinking in the field does seem to be more favorable toward a mixture of property valuations and income, or property valuations, income, and the sales tax base, rather than simply property valuations alone. There is no agreement on the proportions in this "mixture" (Burke, 1967; Benson, 1968).

If the two principal measurements of "ability" or "wealth", that is, income and property valuations, were closely correlated then the debate over which is a "better" measurement of ability to support education would have little importance. However, research conducted by James (1963b), Peterson and Rossmiller (1963), and by Davis (1963), suggest that this is not the case. The following state-wide correlations between the two variables have been observed: .57 (Wisconsin), .40 (New York), .38 (Oregon), .34 (California), .30 (Massachusetts), .26 (New Jersey), .09 (New Mexico), .01 (Washington), and one negative correlation, - .18 (Nebraska). A magnitude of .22 was found on a rank order correlation of counties in California. Regional or metropolitan-wide studies may have been completed on this subject but our literature search failed to reveal them.

In addition to the conceptual confusion there is no agreement on statistical procedures for measuring the "equalization effect". Probably the most common procedure is the product moment correlation coefficient or the rank order correlation (Benson and Kelly, 1966; Sampter, 1966; Hempstead, 1969). However, at least one researcher has demonstrated that the Gini Index or "index of concentration" can also be used to measure "equalization" and, for that matter, so can the regression coefficient (Barkin, 1967). Both the product moment correlation and the regression coefficient rest on the assumption that equalization aid is to be distributed in a linear manner through the whole range of a wealth distribution. One must assume that "poor" districts exist above the mean as well as below it. The Gini Index seems a preferable measurement since it is not tied to this linear assumption. Unfortunately, there are other problems in using the Gini Index if the intent is to compare districts either through time, as is the case in this study, or among different states and metropolitan areas.

Much of the difficulty in ascertaining the effect of state aid on local spending lies in what Renshaw (1960) termed "the substitution effect", that is, the substitution of state funds for local funds. James (1963c) has argued that this complication is partially due to the inconsistency in state aid policy. At times states want the aid they distribute to exercise a "stimulation" effect on local school boards and then at other times the state wants to afford "tax relief" to these same local boards. If "stimulation" is the goal then measures such as legal tax ceilings are resorted to which encourage the substitution of state for local funds. These "goal conflicts" are of long standing in school finance (Benson, 1964; Burke, 1967). As can be seen from reviewing the material in section four the empirical research done thus far on the determinants of educational spending does not indicate clearly one way or the other what the effect of state aid is on local spending. Some researchers, notably Sacks, have been able to show a significant effect of state aid, but many other investigators have not.

6.2 Hypotheses

On the basis of the above noted research plus some of the materials reviewed in section four we established four hypotheses:

H1: The correlation of school district income and school district assessed property valuations will be of low magnitude and probably not statistically significant in many metropolitan areas.

H2: The "equalization effect", as measured by the product moment correlation of state aid per pupil with median family income will be of low magnitude and probably not statistically significant. However, the "equalization effect" as measured by the product moment correlation of state aid per pupil with assessed property valuation per pupil will be of high magnitude and will be statistically significant.

H3: The equalization effects will have weakened with the passage of time.

H4: State aid per pupil will have a negligible effect on local spending for education.

Data relating to these four hypotheses will be found in tables eleven through fourteen of Appendix A.

6.3 Findings

The correlations indicated in table eleven support hypothesis one. Four of the five correlations in both 1950 and 1960 were not statistically different from zero. Two other observations should be made about this relationship of wealth or "ability to pay" variables in metropolitan areas. First the intra-metropolitan correlations are on the whole lower than the state-wide correlations reported by James. Secondly, and perhaps most interestingly, no less than four of the five correlations in 1960 are actually negative in sign. James found this to be true for only one of his states. Apparently there is a weak tendency for income and assessed valuations to separate in metropolitan areas, that is, where one form of wealth is found, the other will generally not be found. However, the correlations are of such a low magnitude that it would be sounder to say simply that there is no reliable relationship between the two measures of wealth. It therefore follows that no change can be observed in these relationships with the passage of time and that is also indicated by the non-significant findings in the third column of table eleven.

The second hypothesis is also supported. As table twelve indicates there is an equalization effect present in four of the five areas when property valuations are used as the measure of wealth. It appears to be quite strong in Detroit and St. Louis and somewhat weaker in Boston and Cleveland. In Chicago there was apparently a counter-equalizing effect, that is, in 1960 wealthier districts received more state aid than poor districts. However, a check of the original data reveals that the variation among high school districts in state aid was not very great and while this counter equalization is interesting, it probably did not have much practical significance in 1960. Interpretation of the St. Louis data is quite difficult since the equalization effect one is observing here is the combined effect of two state programs, that of Illinois and that of Missouri. Other researchers have found the state aid system of Missouri not to be particularly equalizing (Thomas, 1966; Barkin, 1967) and a reasonable hypothesis might be that the Illinois contribution is producing much of the observed equalization.

Table thirteen documents the fact that state aid is not distributed in any statistically significant linear manner relative to the income of the school district. None of the correlations are significant but it is interesting to note that both in Boston and in Detroit state aid was being distributed in a counter-equalizing manner in 1960. In these two metropolitan areas the wealthier school districts were receiving more state aid than the poorer school districts. Table thirteen thus answers one of our major questions. The distribution of state aid during the decade under study did nothing to mitigate or offset the trend toward greater inequality of human resources among school districts. In fact, in the Boston and Detroit areas it probably contributed to greater inequality among school districts.

The third hypothesis is not supported. Only in the Boston metropolitan area where a drastic shift occurred from a state aid system that had an equalization effect with respect to income in 1950, to a system that had a counter equalization effect with respect to income in 1960, do we find a statistically significant trend. It is true that the data of table thirteen suggests that at least with respect to income there has been a general weakening of the equalization power or effect of state aid distribution schemes. For the four areas in which we can make comparisons, two of these went from equalizing to counter-equalizing and a third had its equalization power weakened with the passage of time. In the St. Louis area, however, a system that was counter-equalizing became mildly equalizing. With respect to property valuations, equalization power increased slightly in three areas and decreased slightly in one.

The fourth hypothesis is supported. With one exception state aid does not appear to add any significant explanatory power to the models of expenditure determination. It must be admitted that it does take a rather powerful variable to stand up under the type of statistical test that is being used here and is described in part D of table fifteen. This incremental regression approach allows all other variables to operate first and only then calls upon the variable under consideration to indicate its added predictive power. This approach, however, was probably fully justified in this situation since state money was also included in the expenditure variable and there should have been some auto-correlation effect in the data. The general predictive power of the expenditure determination models is increased, of course, by the addition of the state aid variable. In both the Boston and the St. Louis areas the models are now leaving less than fifteen percent of the variation in local spending unexplained.

6.4 Conclusions and Speculation

Conclusions in this section should perhaps be treated in a more tentative manner than in other sections of this report. In particular the uncertainty over the appropriateness of the Pearson product moment correlation coefficient to represent "equalization" makes the interpretation difficult. There are also problems caused by the mixing of two state distribution systems in the St. Louis area, and the unfortunate consequences of the dual district structure in the Chicago area. However, we can say that the impression gathered from the map study in part three, that is, that the two measures of wealth are not very overlapping, is now firmly supported by statistical evidence. This lack of congruence has many practical implications. For example, should any of the five state governments included in this study attempt to bring an income measurement even partially into their state distribution formula, a rather drastic redistribution will take place in the apportionment of state aid. This redistribution may well be needed, however, since the data also suggests that state aid formulae, at least as they operated in 1960, did little or nothing to equalize relative to human resources of the districts.

The Massachusetts and Michigan state departments of education should take a rather close look at their grant-in-aid systems. If the trend noted in the 1950's continued into the 1960's then, at least in terms of income, what could be described as "aid to the wealthy" may have been in effect in the Boston and Detroit metropolitan areas for quite a number of years. As has been mentioned previously, the "two point" longitudinal approach used in this study is but a poor substitute for a true time series of data. Perhaps the suggestion of an "aid to the wealthy" situation will stimulate all state departments of education to gather income data by school district over a number of years. Without this time series of income data we can only pose some tentative hypotheses.

We can find nothing in the data to suggest that state aid to education has a very powerful "stimulation" effect, and the absence of this effect suggests that some substitution or local tax relief has taken place. The state aid formulae in existence in most of these states during the period of the study was some variation of the Strayer-Haig "foundation" approach. This equalization aid was accompanied by flat grants, rather large flat grants in the case of Missouri. It would be interesting to subject states which now have a "percentage equalization" formula, such as New York and Rhode Island, to the kind of statistical test indicated in part D of table fifteen. It is possible that these "cost-sharing" systems might show a greater effect of state aid than do the "foundation" states. Finally, there is certainly nothing in the data to suggest that state aid systems are doing much to offset the trends toward human resource inequality among school districts documented in section two. The degree to which the reader finds this disturbing is probably directly related to whether or not he or she feels that state governments have some responsibility relative to equalizing educational opportunity.

7.0 SUMMARY AND RECOMMENDATIONS

Each of the five substantive sections of this report carries its own "conclusions and speculation" part which should be consulted for detailed results. The intention of this section is merely to highlight the most important empirical findings and on the basis of these findings offer some recommendations for policy formation. The recommendations should be taken as tentative. The major effort reported here was to ascertain what "is" rather than what "ought to be". However, the administrative researcher, unlike some "straight" social scientists, usually has an obligation to indicate how the empirical findings might shape public policy in education.

7.1 Major Findings

The following are the major findings of the study. The reader should refer to the sections indicated in the parentheses for the necessary qualifications on each finding.

I. There is evidence of increasing "de facto" socio-economic segregation in all five metropolitan areas studied. Suburban school districts were more unequal with respect to human resources at the end of the decade than they were at the beginning of the decade. It would appear that increasing inequality of resources is _not_ limited to the central city versus suburban axis, but that there is also increasing inequality _among_ suburban school districts. (See section #2 and section #3)

II. In some metropolitan areas sectors or clusters of advantaged and disadvantaged school districts have formed. These sectors or clusters of contiguous school districts are much alike with regard to their internal socio-economic composition. There appears to be considerable geographic distance between the advantaged and the disadvantaged sectors or clusters. (See section #3)

III. There is evidence of increasing determination of local levels of spending by the material and human resources present in the various school districts. The unequal distribution of resources therefore directly affects the level of services provided students and probably affects their educational opportunities. (See section #4 and section #5)

IV. Certain types of districts, such as industrialized suburbs, appear to be financially advantaged in that they can attain high levels of expenditure with very little effort. Other types of districts, such as workingmen's "bedroom" suburbs are financially disadvantaged in that they must exert a great deal of tax effort to attain only a modest expenditure level. (See section #5)

V. State grants-in-aid to education do not appear to have been very successful in reaching their "equalization" goals. In many metropolitan areas expenditure levels have become more unequal and greater disparity is also observable with regard to tax burdens. In some areas wealthy school districts have actually been given more aid than poor school districts. (See section #2 and section #6)

7.2 Recommendations

In the light of these findings we offer the following six recommendations. The first two of these might be brought into being in the relatively near future, and the other four are at least deserving of further study.

I. It is recommended that an income measurement be introduced into the general aid formula in most states. Despite many criticisms that can be levied against income as a measure of "ability to support education", we feel that the first finding cited above is of such importance that no other arguments should be allowed to prevail against it. Until this is done it is doubtful that any really meaningful "equalization" can be brought about in metropolitan areas. Unfortunately, it would appear that the clock may be running against us. The longer states wait, the more difficult it may be to introduce an income measurement into the formula. However, since the redistributive effect will be drastic no matter when it is introduced, it is also recommended that the measurement be introduced in a relatively mild fashion. This can be accomplished by attaching it to the present property valuation figure in the form of a weighting. The weights can be so engineered that the effect will not be felt quite as sharply as might otherwise be the case. Securing an adequate income measurement will not be easy. However, since most states have now adopted a state income tax the information required for that purpose can also be used for state aid distribution purposes, provided there is adequate cooperation between the state revenue departments and the departments of education.

II. It is recommended that an intermediate school district of a service character be set up to aid the sectors or pockets of disadvantaged school districts that are forming in suburbia. This unit should be funded entirely from state and federal funds, and not from local sources. If possible its headquarters should be located in the center of the largest disadvantaged sector in the metropolitan area. In some states this could be a decentralized division of the state department of education. The function of the unit would be to provide "aid-in-kind" to concentrations of disadvantaged students in suburbia. In general, it is our feeling that suburban cultural deprivation has been overlooked in the rush to treat the admittedly severe problems of the central city.

III. It is recommended that a study be made of those districts that are high on tax effort, but relatively low on expenditure. We have the feeling that somehow these districts are probably being left out of current aid approaches. Interestingly enough, the ratio of tax effort to expenditure has not been used very much for analytical purposes. The nature of the distribution of this ratio should be studied and experiments conducted which might lead toward using it as a weighting in state aid formulae.

IV. It is recommended that a study also be made of the "doubled disadvantaged" districts, that is, those unfortunate districts in metropolitan areas that find themselves at the bottom of both the property valuation and income distributions. Surely the administration of education is carried on in these districts under very severe limitations, and assistance is most merited.

V. It is recommended that a study be made of districts which are "impacted" by nearby heavy concentrations of industry, but which are not fortunate enough to have industry themselves. Although it would be difficult, it might be possible to grant certain districts the right to tax industries which did not lie geographically within their boundaries. This would probably only be feasible where most of the families in the district worked in one or two adjacent industries.

VI. It is recommended that a unit be set up within each state department to monitor human resource shifts among school districts throughout the state. The divisions of finance and statistics found in most state departments of education could do this, but they have little experience with gathering and processing other than traditional school district fiscal characteristics. The data banks of state education departments need to be broadened to include social and economic characteristics as well as the traditional financial measurements.

The above recommendations are primarily directed toward the alleviation of educational deprivation as it exists in the suburban ring which surrounds most central cities. Educational deprivation unfortunately also continues unabated within the central cities and this problem must continue to demand a large portion of the available resources the state and federal governments have to allocate to public education. A recent study by Herriott and Hodgkins (1969) suggests that schools in lower socio-economic neighborhoods within central cities might very well have a better claim on the scarce resources of the state than schools in lower socio-economic contexts within the suburban ring. In any event lower socio-economic schools in the suburbs appear to be somewhat better off in terms of certain educational outputs than their counterparts within the central cities. A reasonable hypothesis might also be that school socio-economic segregation may have proceeded faster within the central city than within the suburban ring. Recommendation number one would, of course, aid these lower socio-economic schools within the central city as well as lower socio-economic schools in the suburbs.

We have now come to the end of this investigation. Unless it is to remain only an interesting piece of historical research, it should be continued to cover the decade of the 1960's. We are reasonably sure that the major trends observed in the 1950's did continue into the 1960's, but only further efforts can really answer that question. It would also help to add a few more metropolitan areas, particularly in the southern and western portions of the country.

If the authors may be permitted a minor jeremiad in closing, we do view the major findings with some concern. The prospect of an increasing socio-economic balkanization of suburban school districts is not a particularly pleasant one. School administrators, fresh from their battles over the subject of "de facto" racial segregation, can apparently only look forward to bloodier campaigns on the battlefields of "de facto" socio-economic segregation. In a rather remarkable little book, Arthur E. Wise has already sounded the tocsin for these new wars (Wise, 1968). Wise suggests that great variance in expenditure levels among local school districts may, in itself, constitute a violation of the equal protection clause of the Fourteenth Amendment of the Constitution. He further argues that the courts may, at some future date, wish to set up guidelines for "maximum-permissable-variance" in expenditures, ability, effort, etc., in much the same way that they now set up guidelines for racial desegregation. Most of the empirical findings presented in this study seem to add support to the Wise thesis. However, before joining him in a call for action by the Supreme Court, the authors would like to see a better empirical basis established for the hypothesis of increasing social and economic segregation among school districts. More research will also be needed on the question of increasing fiscal inequality.

The cause or causes of increasing social and economic segregation among school districts lie deep within the fabric of American social structure. The courts, the legislatures, and the executive branches, can at least treat the symptoms, and perhaps even allay some of the suffering. A cure for the malady will take the combined effort of all branches of government, at all levels. It will also take great public support. And it is here, in this court of final appeal, the public, that we shall discover whether "equal educational opportunity" is only another tired, meaningless piece of educational jargon, or whether it is a living and dynamic value, capable of moving men to action.

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APPENDIX A: TABLES OF THE STUDY

Table One	Further Details on Variables Used in the Study
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TABLE ONE: FURTHER DETAILS ON VARIABLES USED IN THE STUDY

Expenditure Per Pupil: This is based upon current operating expenditures per pupil in either average daily attendance or net average membership depending upon the particular state. Capital expenditures are not included. In Illinois, these are expenditures as reported in their so-called "educational fund". The expenditures include state funds and are not expenditures raised solely from local tax sources.

State Aid Per Pupil: This includes equalization aid in all states except Missouri which had no equalization during this period. In 1950 high school districts in the Chicago area did not receive equalization aid and therefore the Chicago data has been omitted from some of the tables.

Assessed Property Valuations Per Pupil: In all cases this is based upon state adjusted property valuation figures and includes in an undifferentiated form residential, commercial, and industrial valuations. The ratio of assessed to "real" value varies from state to state but this poses a problem only in the St. Louis data.

Tax Rate for Education: With the exception of Illinois this is the rate levied for total support of the schools. It is the legal rate except in Massachusetts where a substitute value was used. In Illinois it is the rate levied in their so-called "educational fund". Each state expresses the rate differently, i.e., mills, dollars on the hundred, thousand, etc., and therefore the data should not be pooled.

Percentage College Educated: Based on the proportion of persons 25 years old and over with four years or more of college education.

Median Family Income: This is the median income for families and unrelated individuals and not for families alone. Comparability with the 1950 census mandated this measurement.

Occupational Index: This is based upon the ratio of the proportion of "professional" plus "managerial" to the proportion of "craftsmen" plus "operatives" in a particular school district. See the Federal Census of Population for detailed definitions of these occupational categories.

Sources of Data: Data on the first four variables was supplied directly by the State Departments of Education in Illinois, Massachusetts, Michigan, Missouri, and Ohio. Data on the last three variables was obtained from the following census documents: From the 1950 Census: Bulletins P-D 47, 10, 06, 12, 17. From the 1960 Census: Final Reports PHC (1) 131, 026, 018, 028, 040.

TABLE TWO: LEVELS OF SIGNIFICANCE OBTAINED FROM "T" TESTS ON THE CORRELATED VARIANCES OF SCHOOL DISTRICTS, 1950 vs. 1960

Variable	St. Louis	Chicago	Boston	Cleveland	Detroit
Expenditure per Pupil	+ .01	- .01	+ .01	+ n. s.	+ .01
State Aid per Pupil	+ .01	X	+ n. s.	+ .01	+ .01
Assessed Property Valuations per Pupil	- n. s.	- .01	- n. s.	+ .01	+ .01
Tax Rate for Education	+ n. s.	+ .01	+ .05	+ .01	+ n. s.
Percentage College Educated	+ .01	+ n. s.	+ .01	+ n. s.	+ n. s.
Median Family Income	+ .01	+ .01	+ .01	+ .01	+ .01
Occupational Index	+ .01	+ .01	+ .01	+ n. s.	+ .01

TABLE THREE: PREDICTIVE POWER OF THE CROSS-SECTIONAL MODELS

Metropolitan Area	Coefficient of Determination, 1950	Coefficient of Determination, 1960	N
Boston	.668 **	.832 **	72
Chicago	.167	.423 *	28
Cleveland	.498 **	.704 **	29
Detroit	.796 **	.673 **	23
St. Louis	.395	.838 **	23

* Significant at the .05 level.
** Significant at the .01 level.

TABLE FOUR: PREDICTIVE POWER OF THE SIMULTANEOUS CHANGE MODELS

Metropolitan Area	Absolute Change	Percentage Change	Positional Change	N
Boston	.526 **	.632 **	.495 **	72
Chicago	.046	.264	.108	28
Cleveland	.537 **	.153	.211	29
Detroit	.523 *	.310	.423	23
St. Louis	.611 **	.658 **	.108	23

* Significant at the .05 level.
** Significant at the .01 level.

TABLE FIVE
ORDER OF DETERMINANTS OF THE CROSS-SECTIONAL MODELS

Metropolitan Area	1950 Determinants First	1950 Determinants Second	1950 Determinants Third	1960 Determinants First	1960 Determinants Second	1960 Determinants Third	N
Boston	V **	O **	T **	O **	V **	T **	72
Chicago	T	V	I	V **	T *	I	28
Cleveland	O **	-	-	V **	O **	-	29
Detroit	V **	-	-	V **	O **	T *	23
St. Louis	I **	-	-	O **	V **	I **	23

* Significant at the .05 level.
** Significant at the .01 level.

Code: V = Assessed Property Valuation Per Pupil
O = Occupational Index
T = Educational Tax Rate
I = Median Family Income

TABLE SIX: ORDER OF DETERMINANTS OF THE SIMULTANEOUS CHANGE MODELS

Metropolitan Area	Absolute Change			Percentage Change			Positional Change		
	First	Second	Third	First	Second	Third	First	Second	Third
Boston	T **	V **	O **	T **	V **	C *	T **	V **	O **
Chicago	V	C	I	O	T	C	I	V	T
Cleveland	V **	O	C	O	I	V	V *	O	I
Detroit	V **	O *	C	T	O	I	V	O	T
St. Louis	O **	I	C	V *	T *	C	V	O	I

* Significant at the .05 level.
** Significant at the .01 level.

Code: V = Assessed Property Valuation Per Pupil
O = Occupational Index
T = Educational Tax Rate
I = Median Family Income
C = Proportion of College Graduates

TABLE SEVEN: MEAN PER PUPIL EXPENDITURE BY TYPE OF DISTRICT, circa 1950

Metropolitan Area	(1) High Income - High Prop. Val.	(2) High Income - Low Prop. Val.	(3) High Prop. Val. - Low Income	(4) Low Prop. Val. - Low Income	F test
Boston	226	188	238	184	13.25**
Chicago	478	484	784	682	0.96
Cleveland	242	232	162	187	1.08
Detroit	255	194	309	185	3.69*
St. Louis	362	286	231	193	5.58*

* Significant at .05 level
** Significant at .01 level

The following "t" tests were significant at the .05 level:

Boston:	1 with 2; 1 with 4; 2 with 3; 3 with 4
Detroit:	2 with 3; 3 with 4
St. Louis:	1 with 3; 1 with 4; 2 with 4

TABLE EIGHT: MEAN PER PUPIL EXPENDITURE BY TYPE OF DISTRICT, circa 1960

Metropolitan Area	(1) High Income - High Prop. Val.	(2) High Income - Low Prop. Val.	(3) High Prop. Val. - Low Income	(4) Low Prop. Val. - Low Income	F test
Boston	400	326	361	308	14.70**
Chicago	804	633	831	646	4.01*
Cleveland	611	438	586	432	6.61**
Detroit	596	481	652	396	4.77*
St. Louis	671	647	675	407	2.31

* Significant at .05 level
** Significant at .01 level

The following "t" tests were significant at the .05 level:
Boston: 1 with 2; 1 with 3; 1 with 4; 3 with 4
Chicago: 1 with 2; 1 with 4; 2 with 3; 3 with 4
Cleveland: 1 with 2; 1 with 4
Detroit: 1 with 4; 2 with 3; 3 with 4

TABLE NINE: MEAN TAX RATE BY TYPE OF DISTRICT, circa 1950

Metropolitan Area	(1) High Income-High Prop. Val.	(2) High Income-Low Prop. Val.	(3) High Prop. Val. - Low Income	(4) Low Prop. Val. - Low Income	F test
Boston	.08	.09	.07	.09	10.61**
Chicago	.45	.58	.44	.71	11.39**
Cleveland	13.80	17.36	16.70	16.05	2.21
Detroit	9.33	10.90	7.85	8.93	0.80
St. Louis	2.29	2.74	1.28	2.42	9.31**

** Significant at .01 level

The following "t" tests were significant at the .05 level:

Boston: 1 with 2; 1 with 3; 2 with 3; 3 with 4
Chicago: 1 with 4; 2 with 3; 3 with 4
St. Louis: 1 with 3; 2 with 3; 3 with 4

TABLE TEN: MEAN TAX RATE BY TYPE OF DISTRICT, circa 1960

Metropolitan Area	(1) High Income-High Prop. Val.	(2) High Income-Low Prop. Val.	(3) High Prop. Val. - Low Income	(4) Low Prop. Val. - Low Income	F test
Boston	.09	.11	.08	.12	13.33**
Chicago	.61	.81	.63	.94	3.74*
Cleveland	24.53	26.86	20.21	24.22	3.23*
Detroit	16.67	16.95	15.52	16.22	0.11
St. Louis	3.10	3.30	2.26	3.17	5.36**

* Significant at .05 level
** Significant at .01 level

The following "t" tests were significant at the .05 level:

Boston: 1 with 2; 1 with 4; 2 with 3; 3 with 4
Chicago: 1 with 4; 3 with 4
Cleveland: 2 with 3
St. Louis: 1 with 3; 2 with 3; 3 with 4

TABLE ELEVEN
CORRELATION OF MEDIAN FAMILY INCOME AND ASSESSED PROPERTY VALUATION PER PUPIL

Metropolitan Area	1950 Correlation	1960 Correlation	Sig. of Difference
Boston	- .040	+ .234 *	n. s.
Chicago	- .467 *	- .067	n. s.
Cleveland	+ .105	- .100	n. s.
Detroit	+ .282	- .239	n. s.
St. Louis	- .334	- .172	n. s.

* Significant at the .05 level

TABLE TWELVE
CORRELATION OF PROPERTY VALUATION PER PUPIL AND STATE AID PER PUPIL

Metropolitan Area	1950 Correlation	1960 Correlation	Sig. of Difference
Boston	-.256 *	-.273 *	n. s.
Chicago	-	+.242	-
Cleveland	-.361 *	-.283	n. s.
Detroit	-.809 **	-.900 **	n. s.
St. Louis	-.600 **	-.668 **	n. s.

* Significant at the .05 level
** Significant at the .01 level

TABLE THIRTEEN
CORRELATION OF MEDIAN FAMILY INCOME AND STATE AID PER PUPIL

Metropolitan Area	1950 Correlation	1960 Correlation	Sig. of Difference
Boston	- .487 **	+ .206	.01
Chicago	-	- .360	-
Cleveland	- .407	- .149	n. s.
Detroit	- .237	+ .174	n. s.
St. Louis	+ .254	- .169	n. s.

** Significant at the .01 level

TABLE FOURTEEN
DETERMINANTS OF EDUCATIONAL EXPENDITURE WITH AND WITHOUT STATE AID

	1950 Models			1960 Models		
Metropolitan Area	R-SQR Without	R-SQR With	Sig.	R-SQR Without	R-SQR With	Sig.
Boston	.668	.673	n. s.	.832	.854	n. s.
Chicago	.167	-	-	.423	.441	n. s.
Cleveland	.498	.598	.05	.704	.726	n. s.
Detroit	.796	.803	n. s.	.673	.675	n. s.
St. Louis	.394	.456	n. s.	.838	.867	n. s.

TABLE FIFTEEN
SELECTED TEST STATISTICS USED IN THE STUDY

(A) In Table Two:

$$t = \frac{(s_2^2 - s_1^2)\sqrt{N - 2}}{\sqrt{4 s_1^2 s_2^2 (1 - r_{12}^2)}}$$

where:

s_2^2 = the variance for the second point in time (1960)

s_1^2 = the variance for the first point in time (1950)

r_{12} = the coeff. of correlation for one variable measured at two points in time

(B) In Tables Three and Four:

$$F = \frac{R^2 / m}{1 - R^2 / (N - m - 1)}$$

where:

m = the number of independent predictors

R^2 = the square of the multiple correlation coeff.

(C) In Tables Eleven, Twelve, and Thirteen:

$$z = \frac{z_{r_1} - z_{r_2}}{\sqrt{1/ (N-3) + 1 (N-3)}}$$

where:

z_{r_1} = correlation coeff. for 1960 transformed to Fishers z

z_{r_2} = correlation coeff. for 1950 transformed to Fishers z

(D) In Table Fourteen:

$$F = \frac{(R_1^2 - R_2^2) / (m_1 - m_2)}{(1 - R_1^2) / (N - m_1 - 1)}$$

where:

R_1^2 = multiple R with largest number of predictors

R_2^2 = multiple R with one or more predictors omitted

m_1 = number of predictors in the larger model

m_2 = number of predictors in the smaller model

APPENDIX B: MAPS OF THE STUDY

Map 3.1a: Boston - On Median Family Income, 1950
Map 3.1b: Boston - On Median Family Income, 1960
Map 3.1c: Boston - On Property Valuation, 1950
Map 3.1d: Boston - On Property Valuation, 1960

Map 3.2a: Chicago - On Median Family Income, 1950
Map 3.2b: Chicago - On Median Family Income, 1960
Map 3.2c: Chicago - On Property Valuation, 1950
Map 3.2d: Chicago - On Property Valuation, 1960

Map 3.3a: Cleveland - On Median Family Income, 1950
Map 3.3b: Cleveland - On Median Family Income, 1960
Map 3.3c: Cleveland - On Property Valuation, 1950
Map 3.3d: Cleveland - On Property Valuation, 1960

Map 3.4a: Detroit - On Median Family Income, 1950
Map 3.4b: Detroit - On Median Family Income, 1960
Map 3.4c: Detroit - On Property Valuation, 1950
Map 3.4d: Detroit - On Property Valuation, 1960

Map 3.5a: St. Louis - On Median Family Income, 1950
Map 3.5b: St. Louis - On Median Family Income, 1960
Map 3.5c: St. Louis - On Property Valuation, 1950
Map 3.5d: St. Louis - On Property Valuation, 1960

BOSTON

Code No.	Name of School District	Code No.	Name of School District
1	Arlington	37	Newton
2	Ashland	38	Northreading
3	Belmont	39	Norwell
4	Beverly	40	Norwood
5	Braintree	41	Peabody
6	Brookline	42	Quincy
7	Burlington	43	Randolph
8	Cambridge	44	Reading
9	Canton	45	Revere
10	Chelsea	46	Rockland
11	Cohasset	47	Salem
12	Concord	48	Scituate
13	Danvers	49	Sharon
14	Denham	50	Somerville
15	Dovers	51	Stoneham
16	Everett	52	Sudbury
17	Framingham	53	Swampscott
18	Hamilton	54	Wakefield
19	Hingham	55	Walpole
20	Holbrook	56	Waltham
21	Hull	57	Watertown
22	Lexington	58	Wayland
23	Lincoln	59	Wellesley
24	Lynn	60	Wenham
25	Lynnfield	61	Weston
26	Malden	62	Westwood
27	Manchester	63	Weymouth
28	Marblehead	64	Willmington
29	Medfield	65	Winchester
30	Medford	66	Winthrop
31	Melrose	67	Woburn
32	Middleton	68	Saugus
33	Milton	69	Acton
34	Nahant	70	Maynard
35	Natick	71	Millis
36	Needham	72	Sherborn

CHICAGO

Code No.	Name of School District
1	Oak Park
2	Cicero
3	Evanston
4	New Trier
5	La Grange
6	Harvey-Thorton
7	Chicago Heights
8	Park Ridge
9	Riverside-Brookfield
10	Maywood-Proviso
11	Lemont
12	Franklin Park
13	Mt. Prospect
14	Calumet
15	Argo
16	Blue Island
17	Skokie-Niles
18	Oaklawn-Reavis
19	Glenbrook
20	Hinsdale
21	Glen Ellyn
22	Elmhurst
23	Wheaton
24	Downers Grove
25	Bensenville
26	Highland Park
27	Waukegan
28	Lake Forest

CLEVELAND

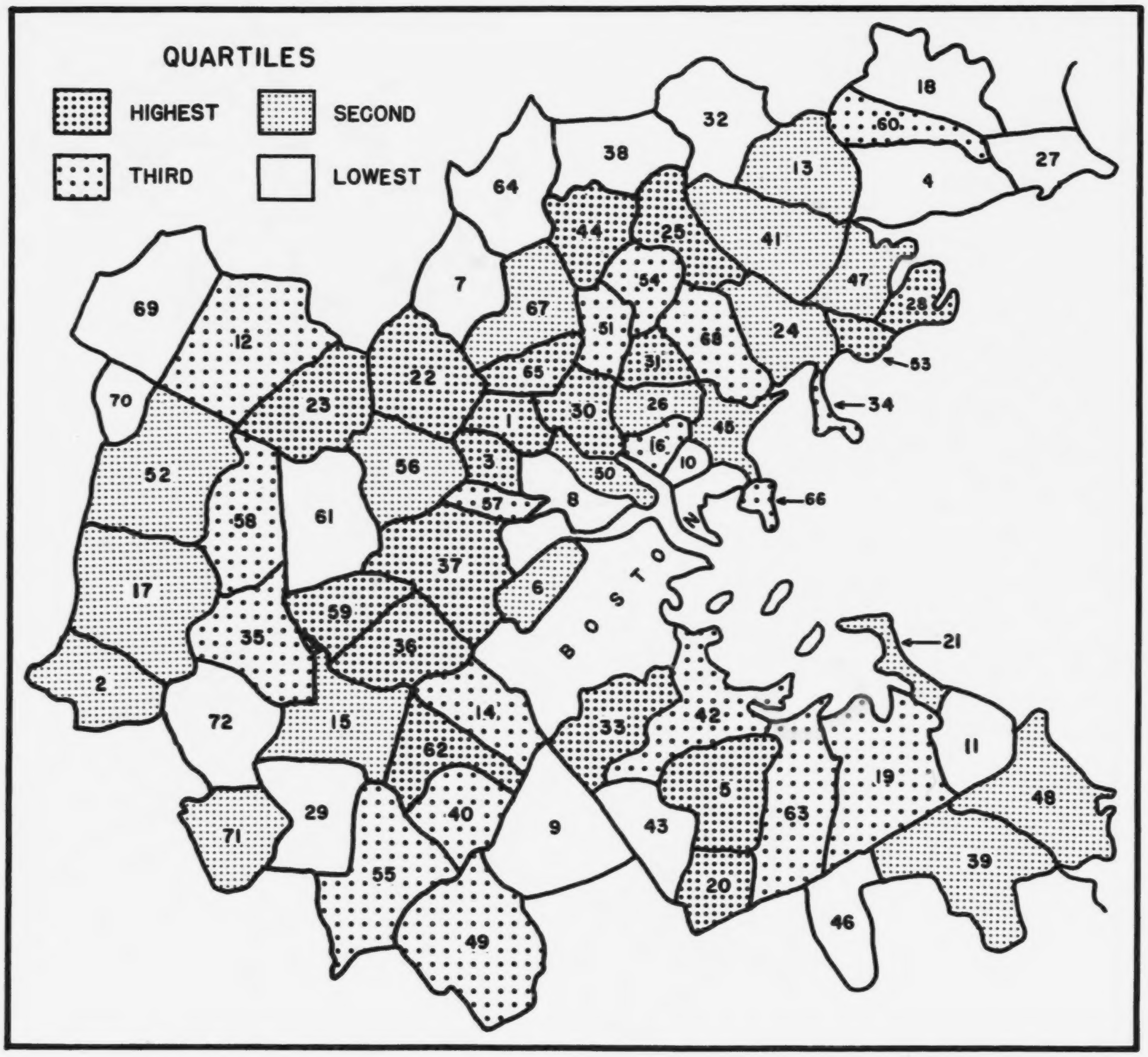
Code No.	Name of School District
1	Bay Village
2	Bedford
3	Berea
4	Brecksville
5	Brooklyn
6	Chagrin Falls
7	Cleveland-University Heights
8	Cuyahuga Heights
9	East Cleveland
10	Euclid
11	Fairview Park
12	Garfield Heights
13	Independence
14	Lakewood
15	Maple Heights
16	Mayfield
17	North Olmsted
18	North Royalton
19	Olmsted Falls
20	Orange
21	Parma
22	Rocky River
23	Shaker Heights
24	Solon
25	South Euclid
26	Strongville
27	West Lake
28	Wickliffe
29	Willoughby

DETROIT

Code No.	Name of School District
1	Allen Park
2	Centerline
3	City of Dearborn
4	Clawson
5	East Detroit
6	Ecorse
7	Fitzerald
8	Garden City
9	Groose Ile
10	Groose Point
11	Hazel Park
12	Highland Park
13	Inkster
14	Lakeshore
15	Lakeview
16	Lincoln Park
17	Livonia
18	Madison Heights
19	Redford Union
20	Rosenville
21	Southlake
22	Van Dyke
23	Wyandotte

ST. LOUIS

Code No.	Name of School District
1	Affton
2	Bayless
3	Berkeley
4	Brentwood
5	Clayton
6	Ferguson-Florrisant
7	Hancock
8	Jennings
9	Kinloch
10	Kirkwood
11	Maplewood-Richmond
12	Melhville
13	Normandy
14	Pattonville
15	Ritenour
16	Riverview Garden
17	University City
18	Valley Park
19	Webster Groves
20	Welston
21	Venice
22	East St. Louis
23	Lovejoy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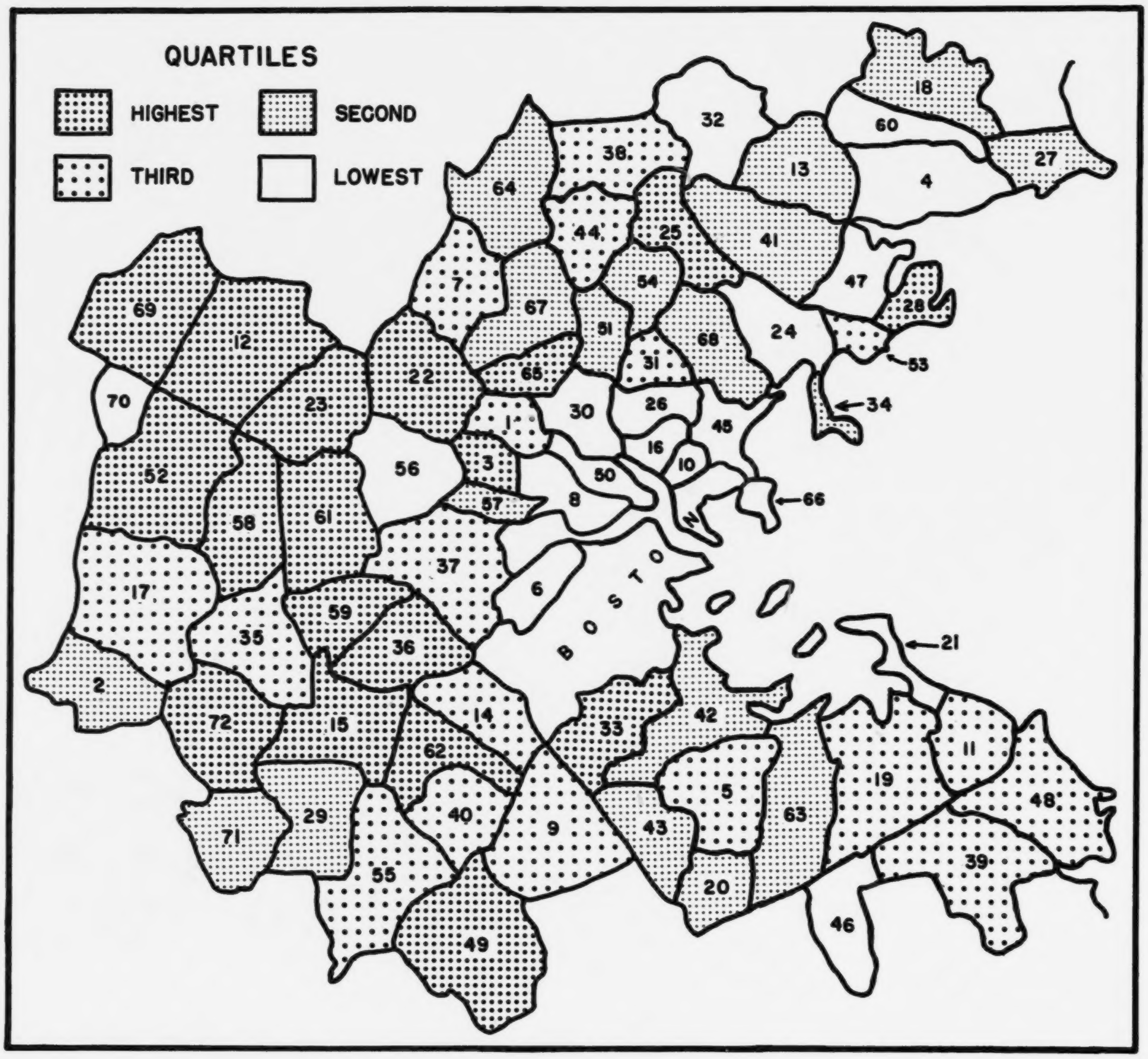
Map 3.1a: Boston - On Median Family Income, 1950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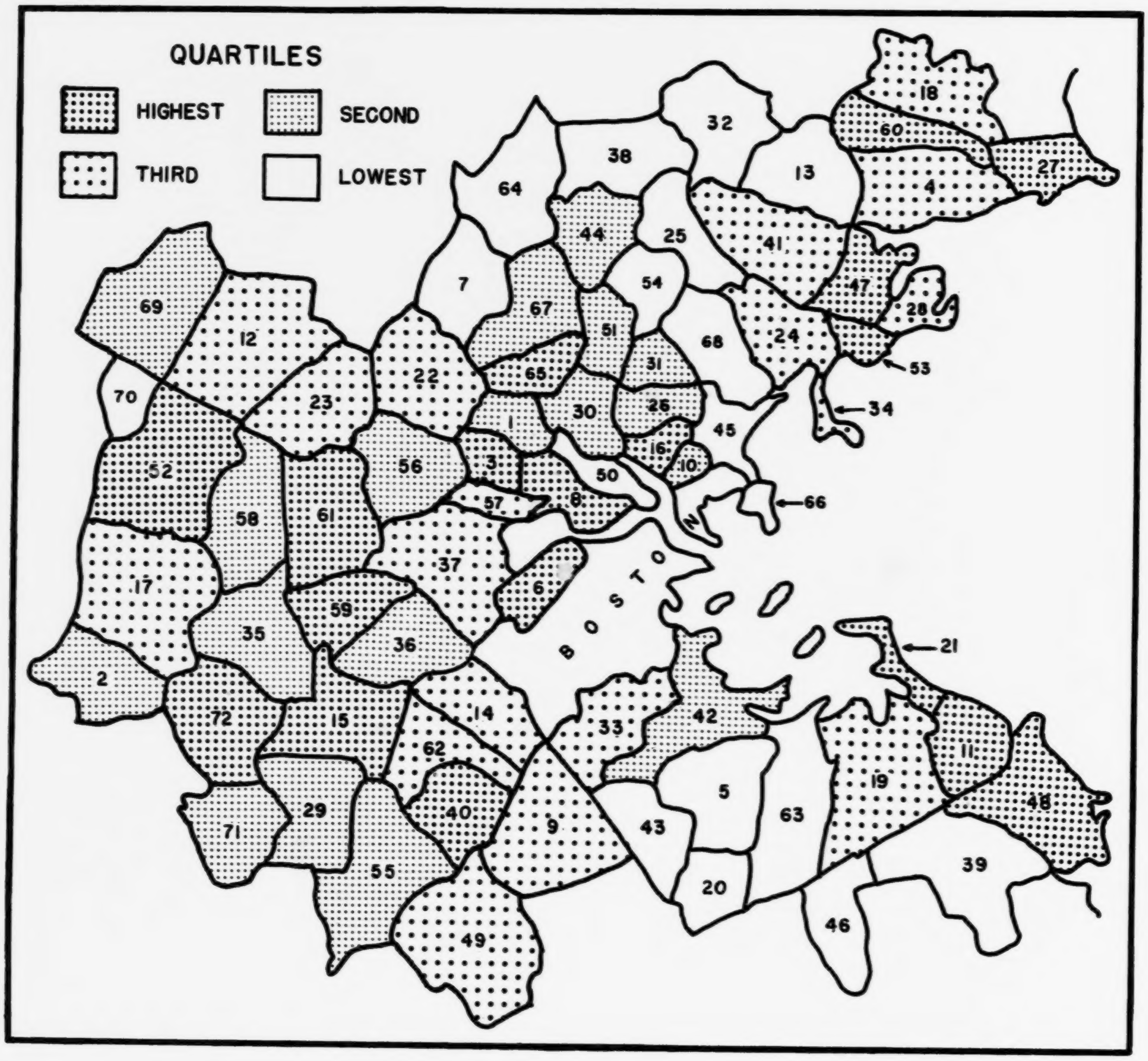
Map 3.1b: Boston - On Median Family Income, 1960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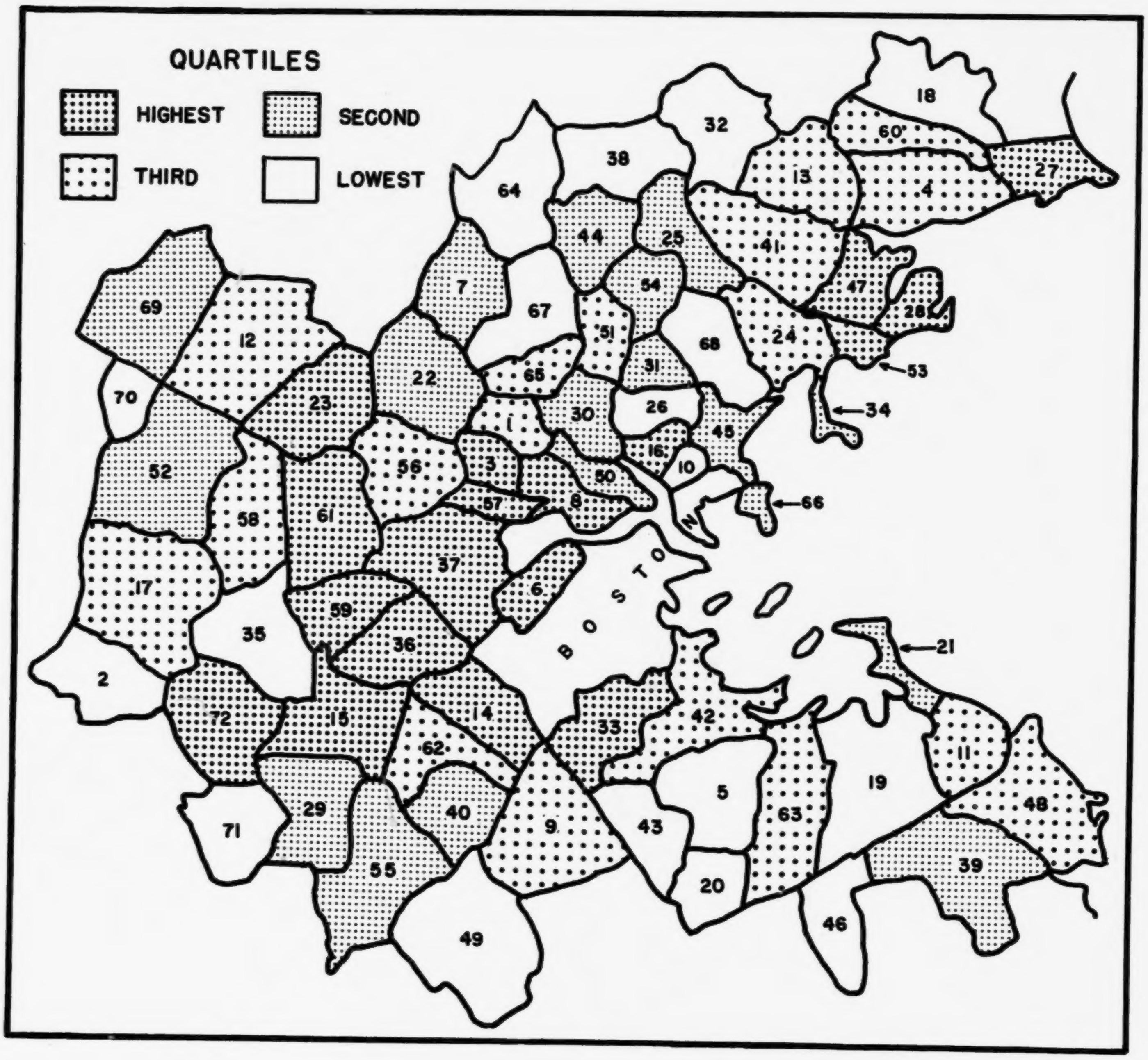
Map 3.1c: Boston - On Property Valuation, 1950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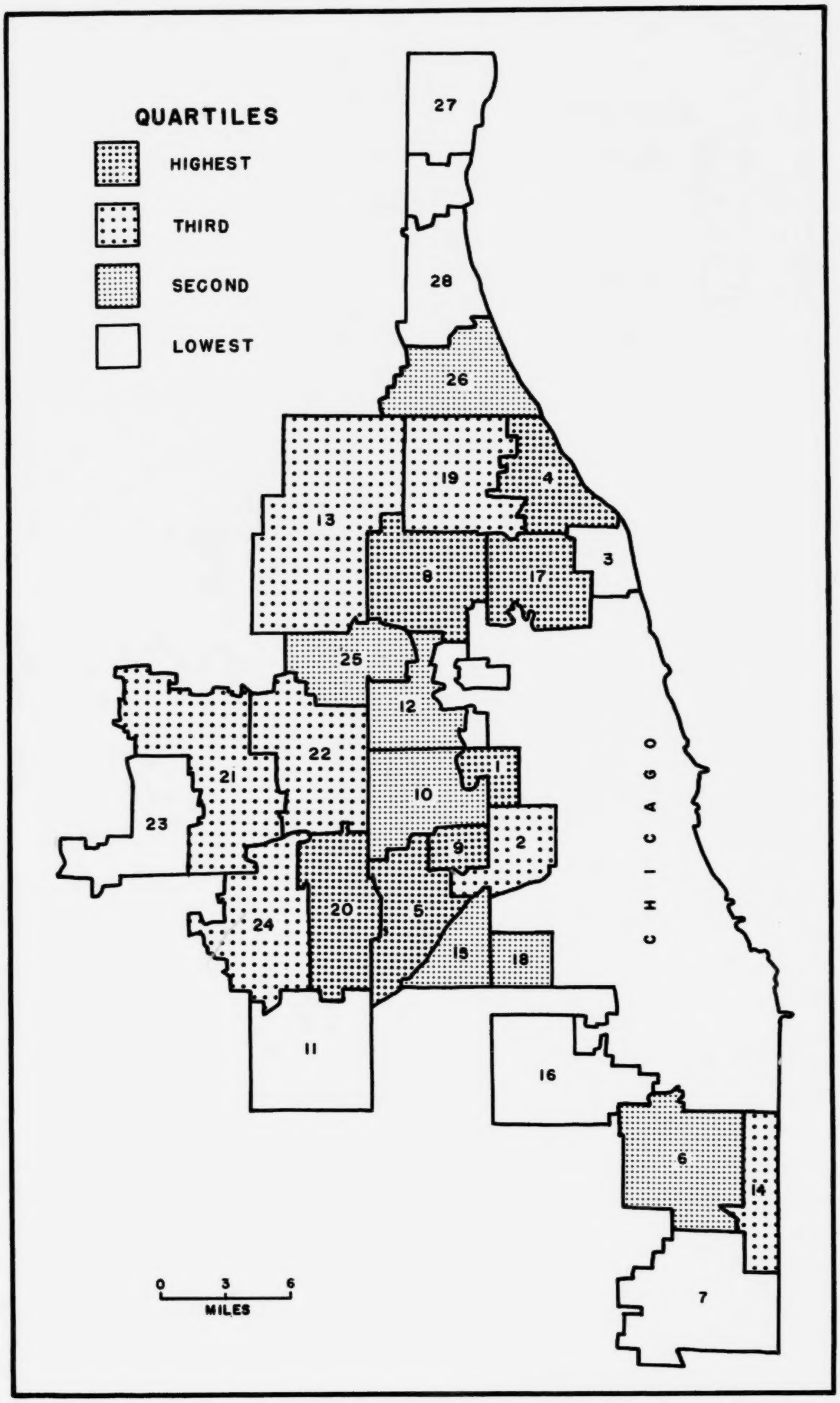
Map 3.1d: Boston - On Property Valuation, 1960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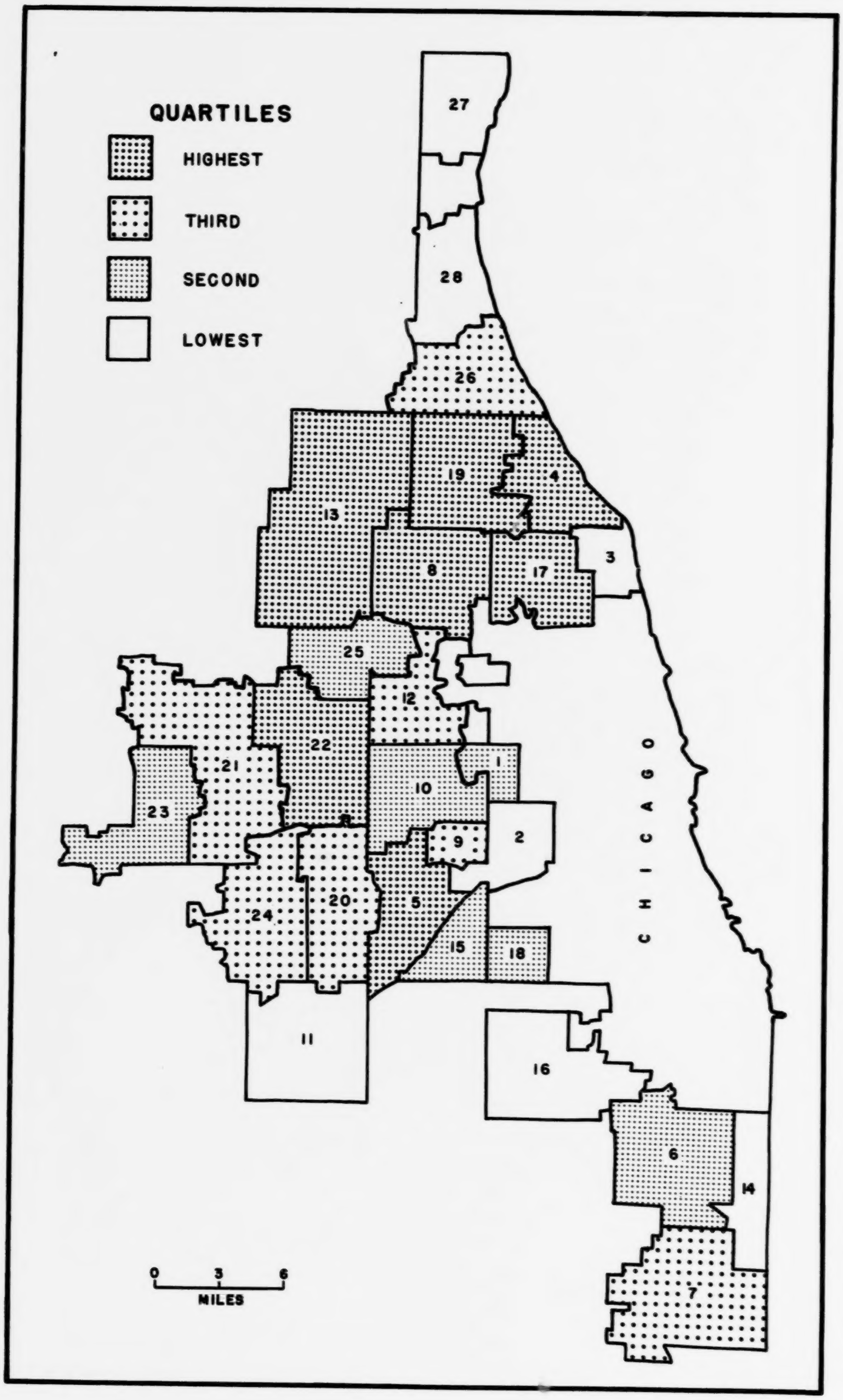
Map 3.2a: Chicago - On Median Family Income, 1950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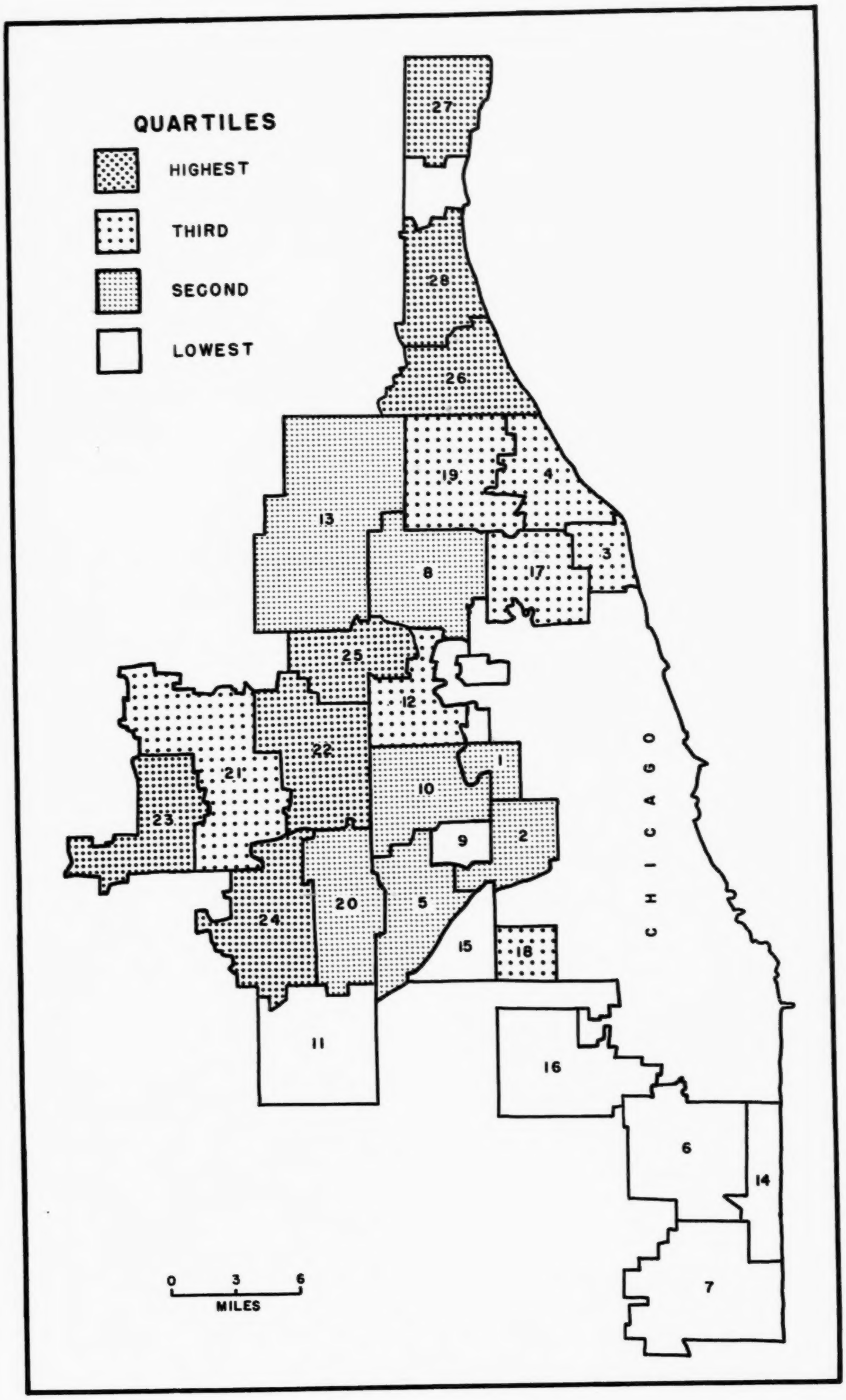
Map 3.2b: Chicago - On Median Family Income, 1960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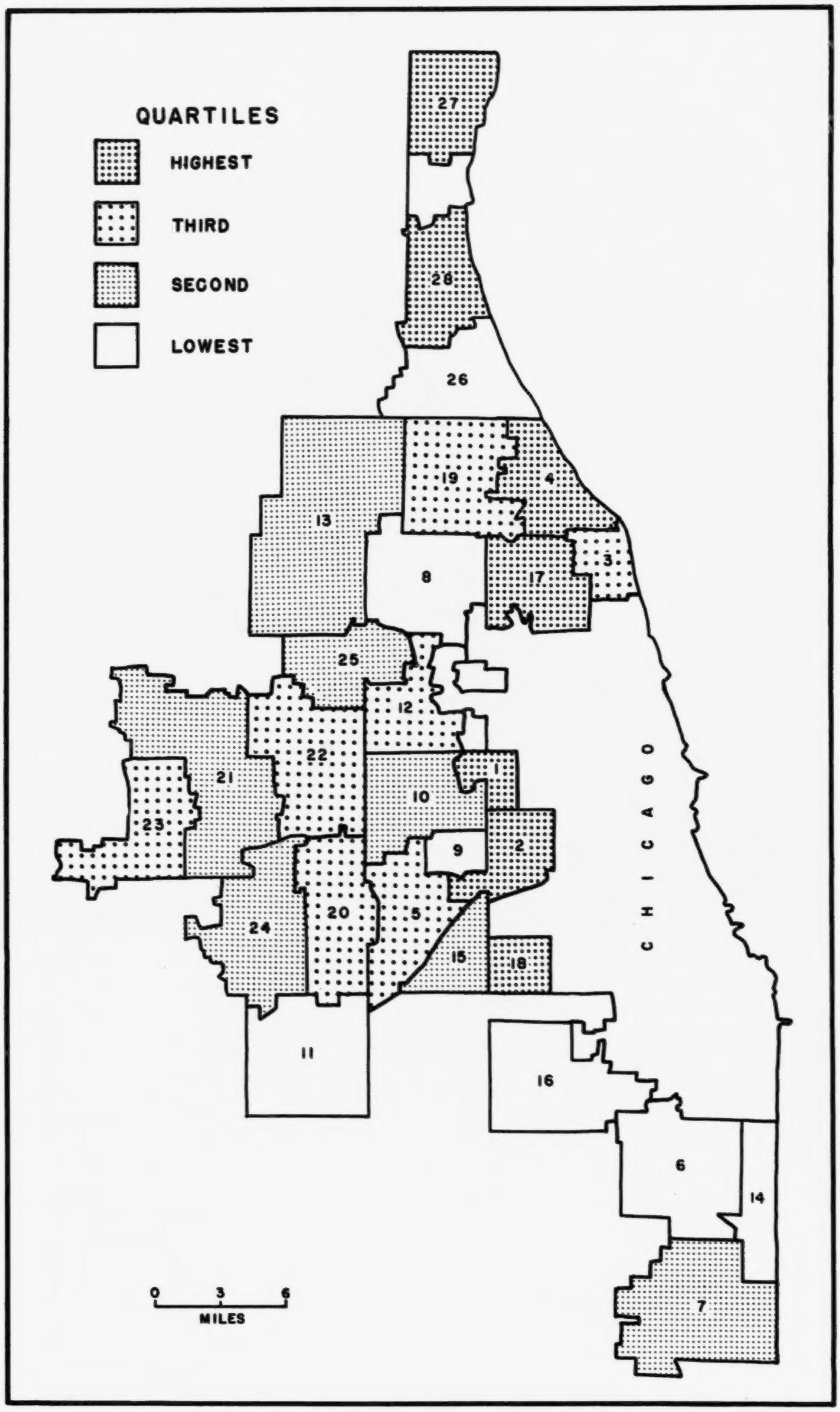
Map 3.2c: Chicago - On Property Valuation, 1950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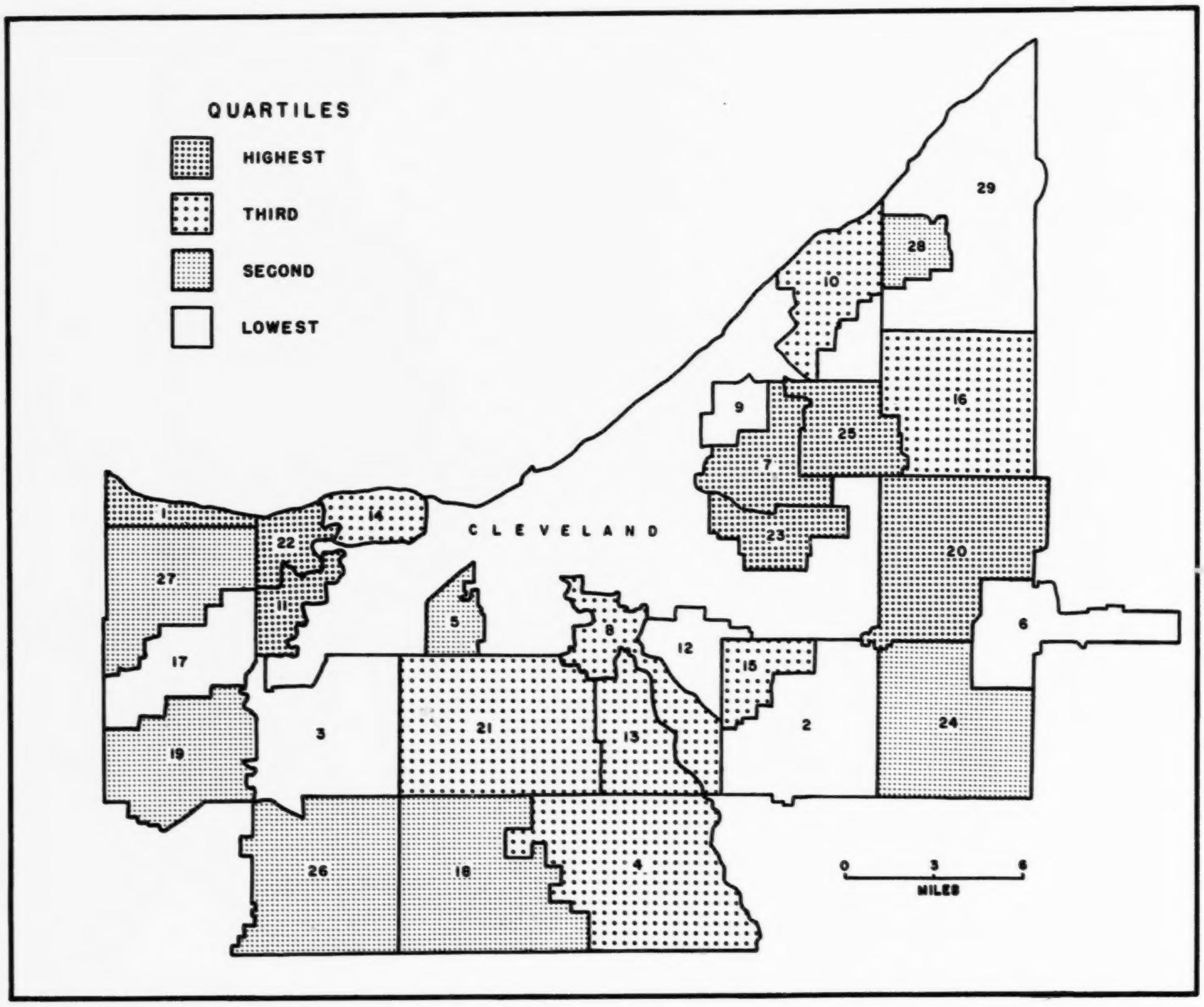
Map 3.2d: Chicago - On Property Valuation, 1960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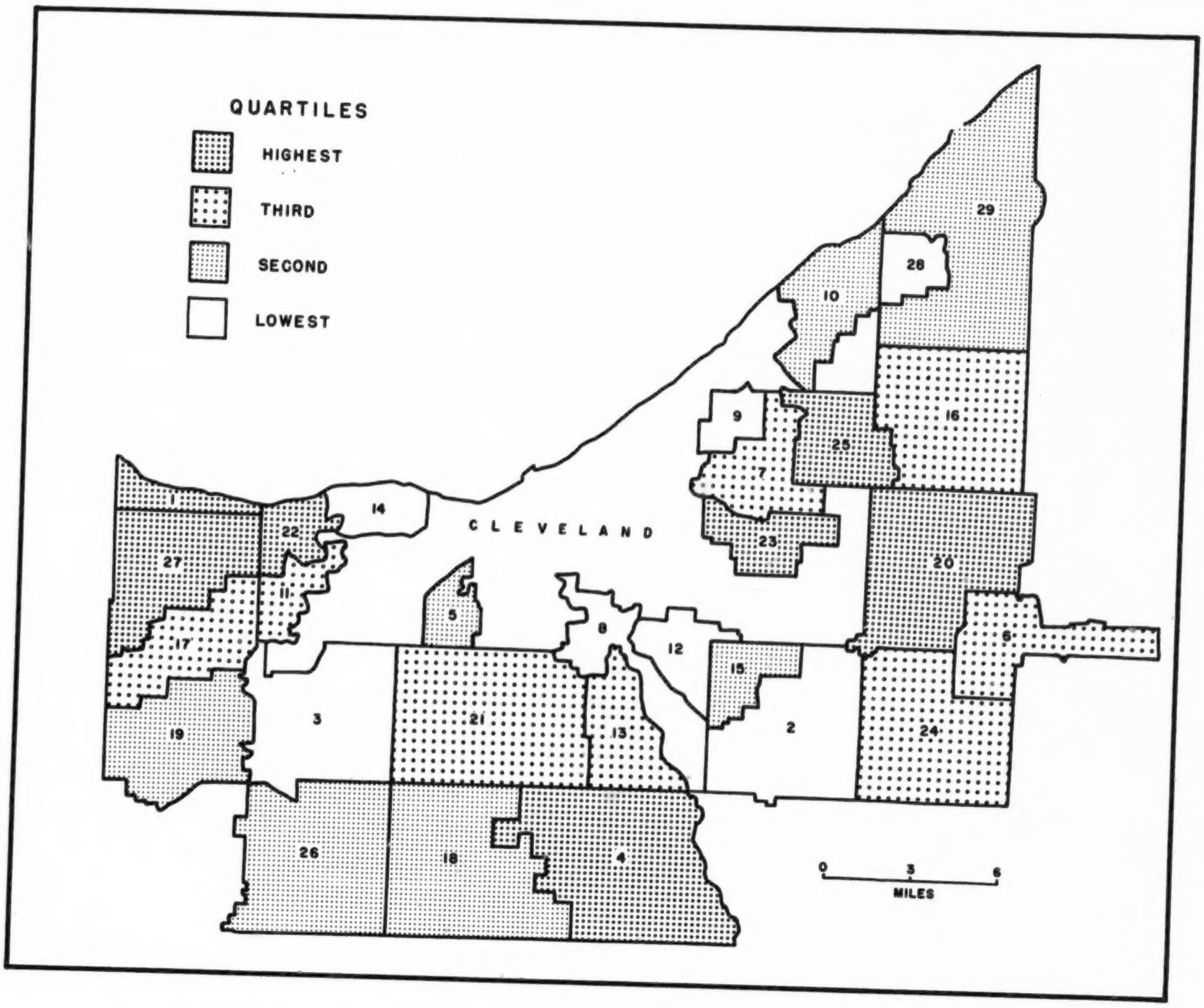
Map 3.3a: Cleveland - On Median Family Income, 1950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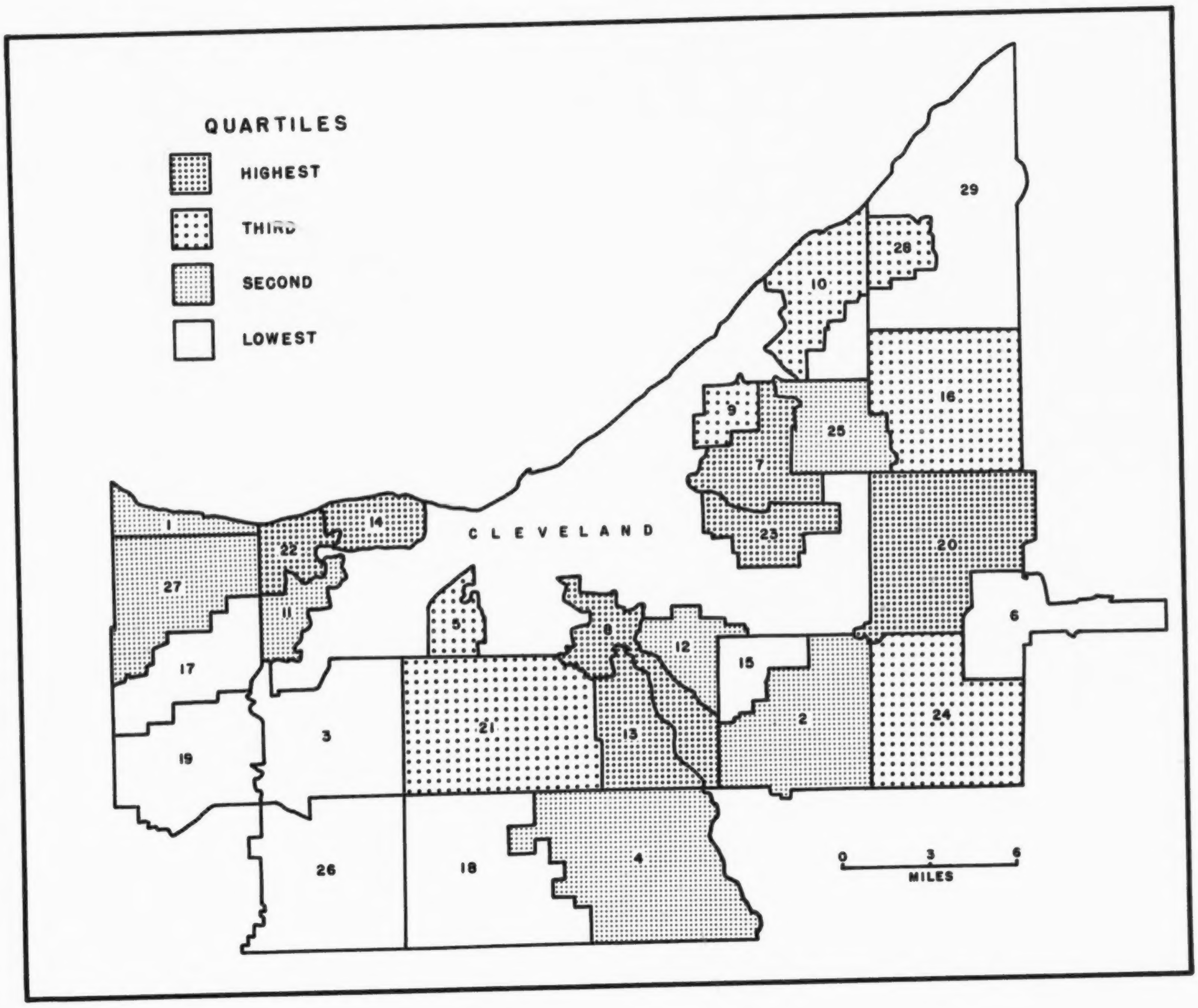
Map 3.3b: Cleveland - On Median Family Income, 1960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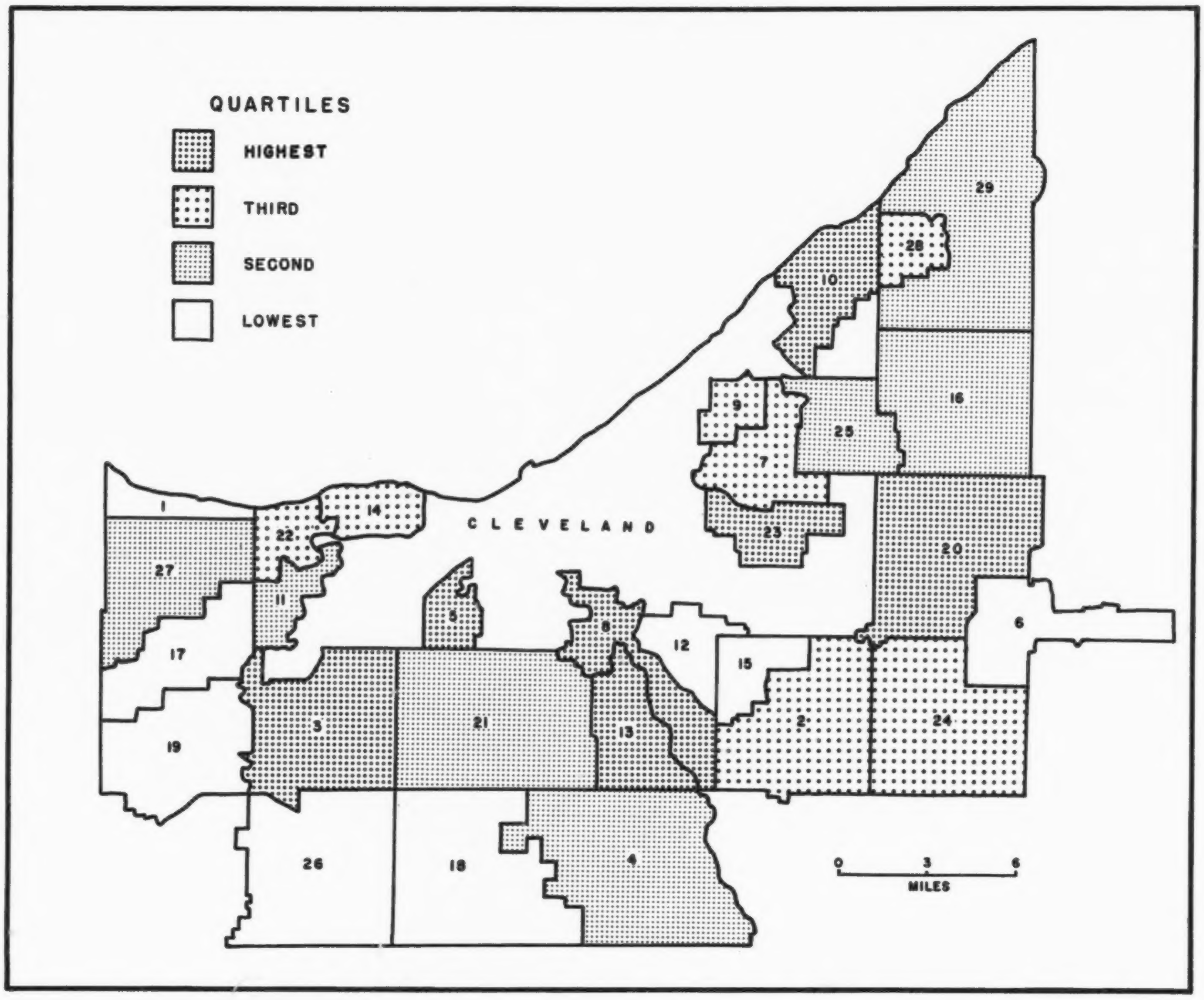
Map 3.3c: Cleveland - On Property Valuation, 1950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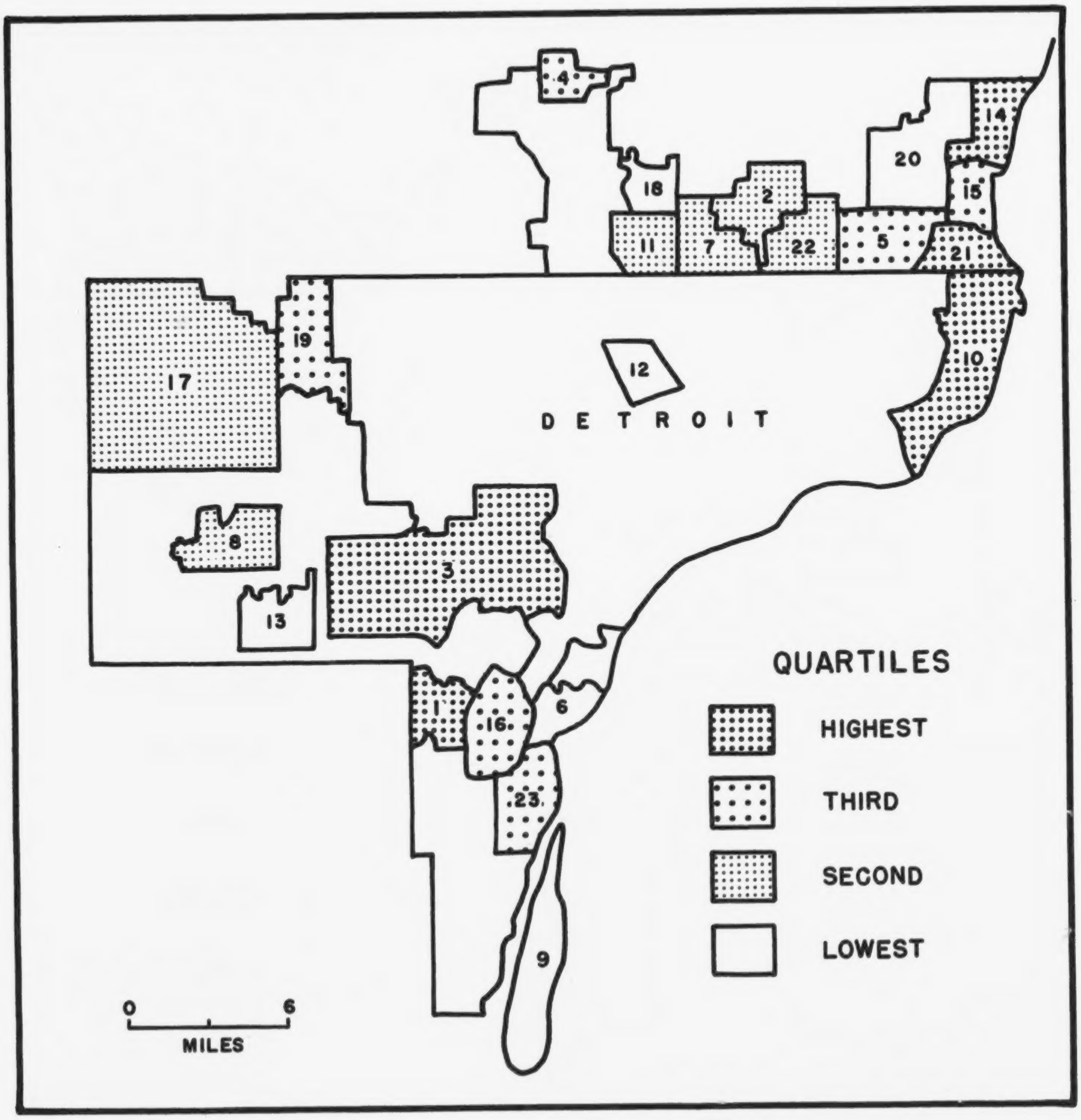
Map 3. 3d: Cleveland - On Property Valuation, 1960



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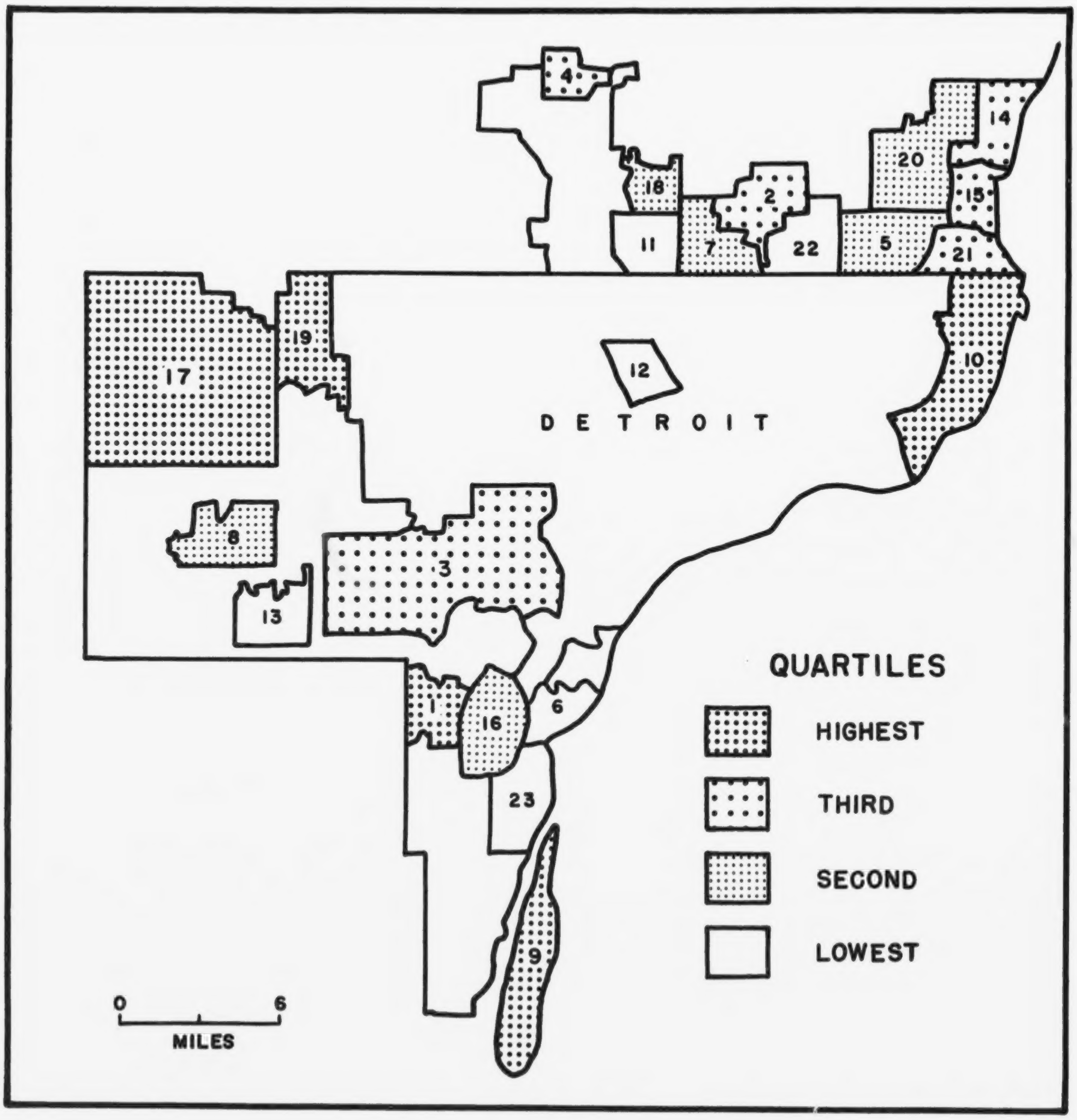
Map 3.4a: Detroit - On Median Family Income, 1950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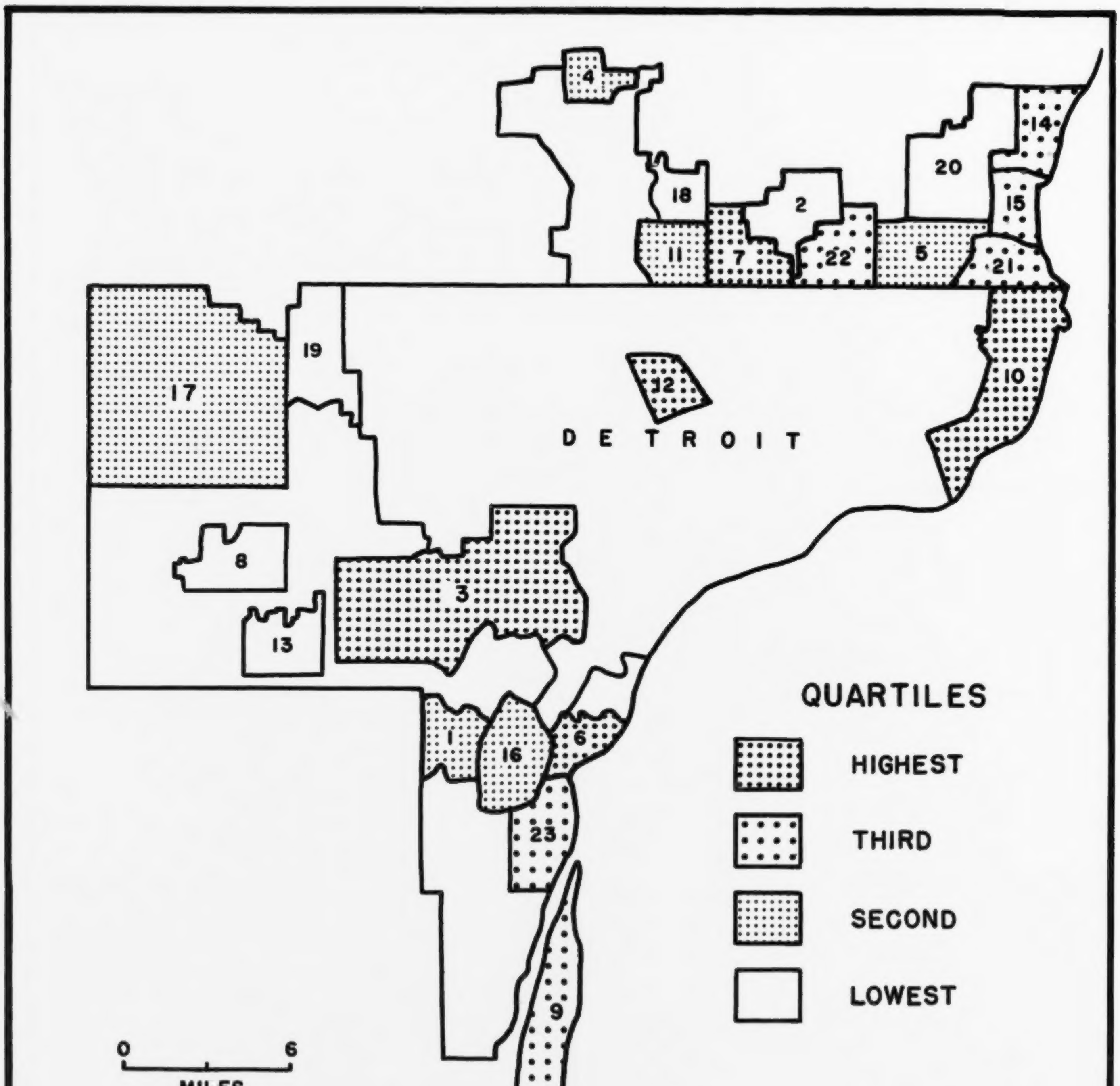
Map 3.4b: Detroit - On Median Family Income, 1960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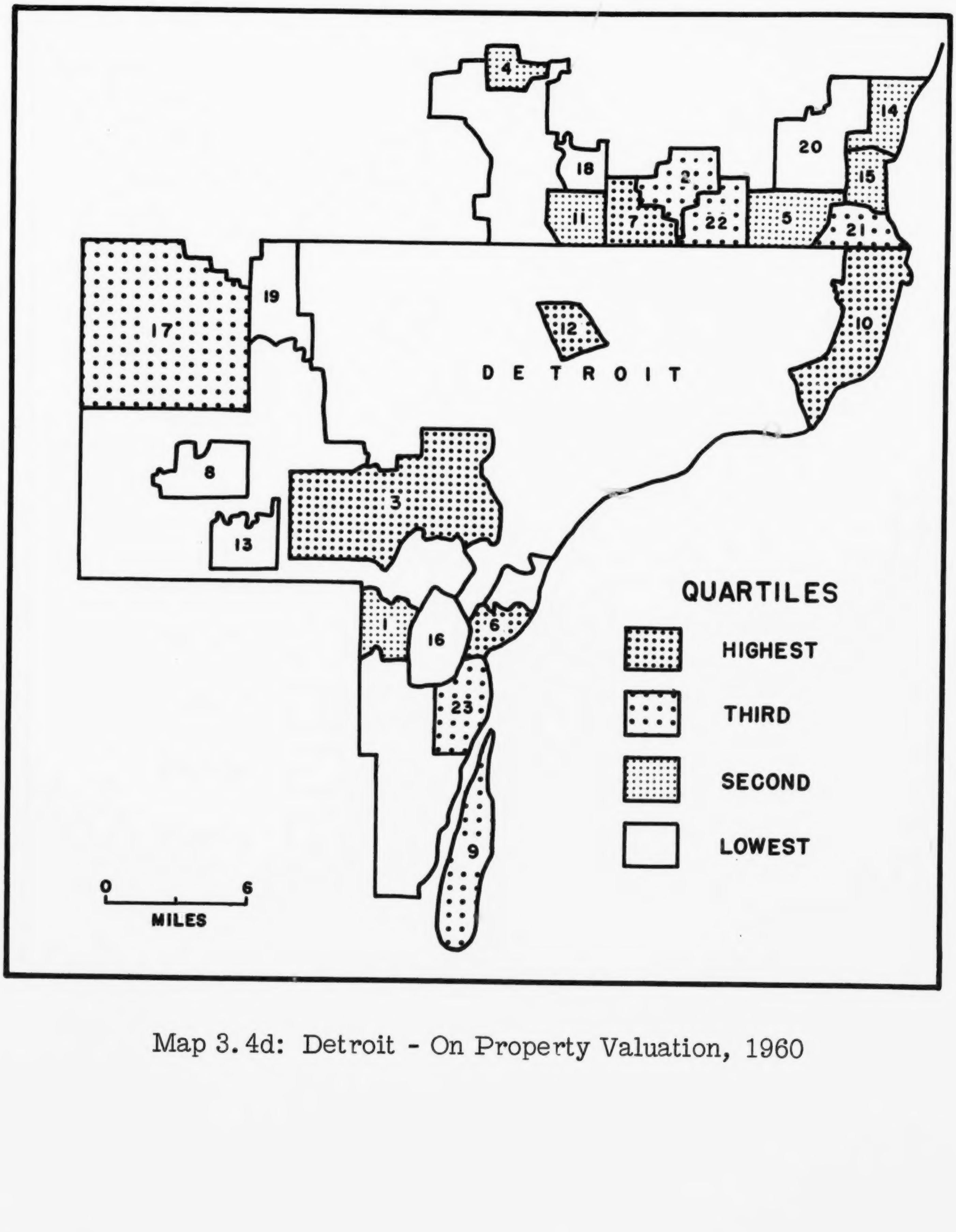
Map 3.4c: Detroit - On Property Valuation, 1950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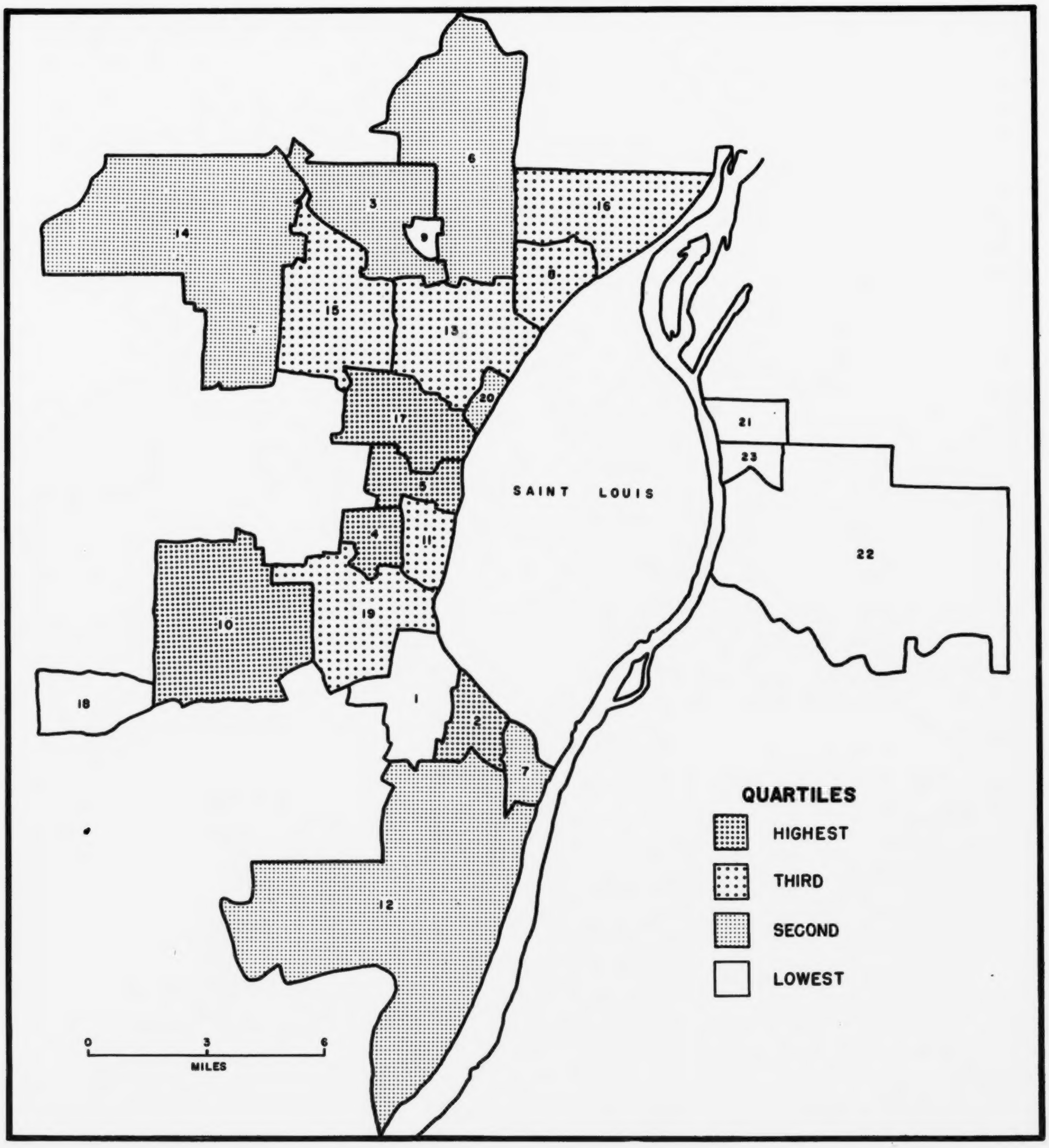
Map 3.4d: Detroit - On Property Valuation, 1960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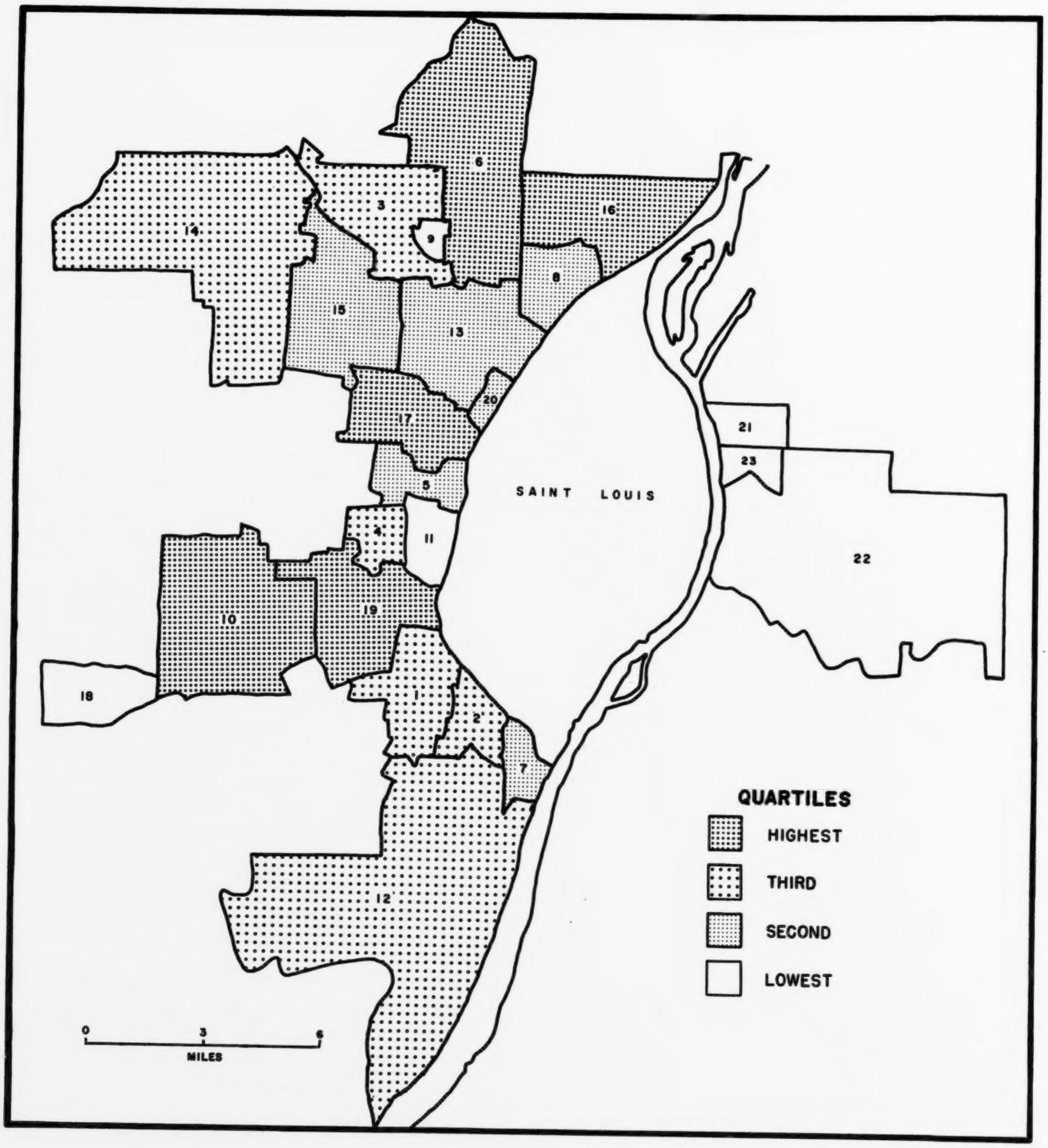
Map 3. 5a: St. Louis - On Median Family Income, 1950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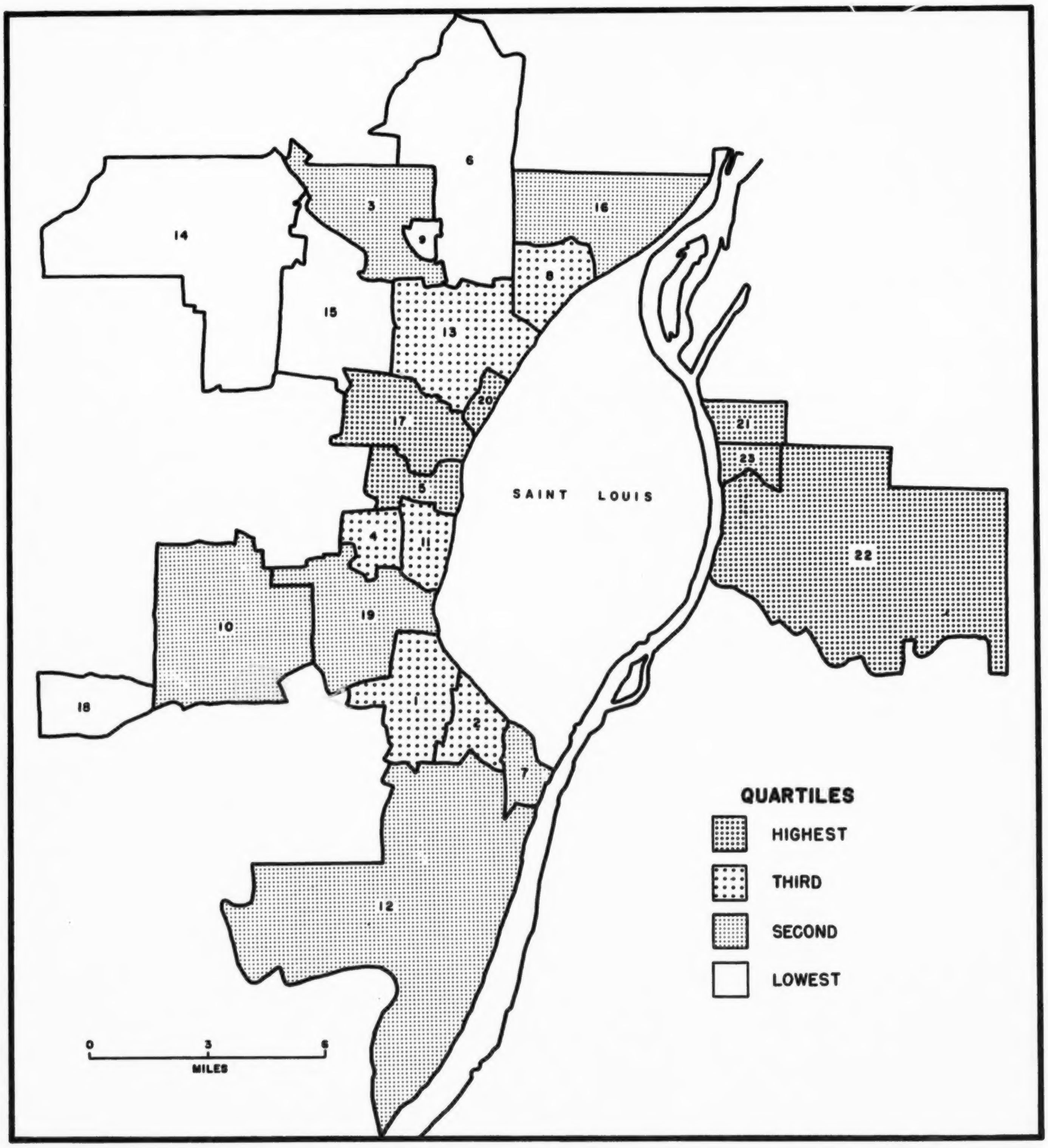
Map 3. 5b: St. Louis - On Median Family Income, 1960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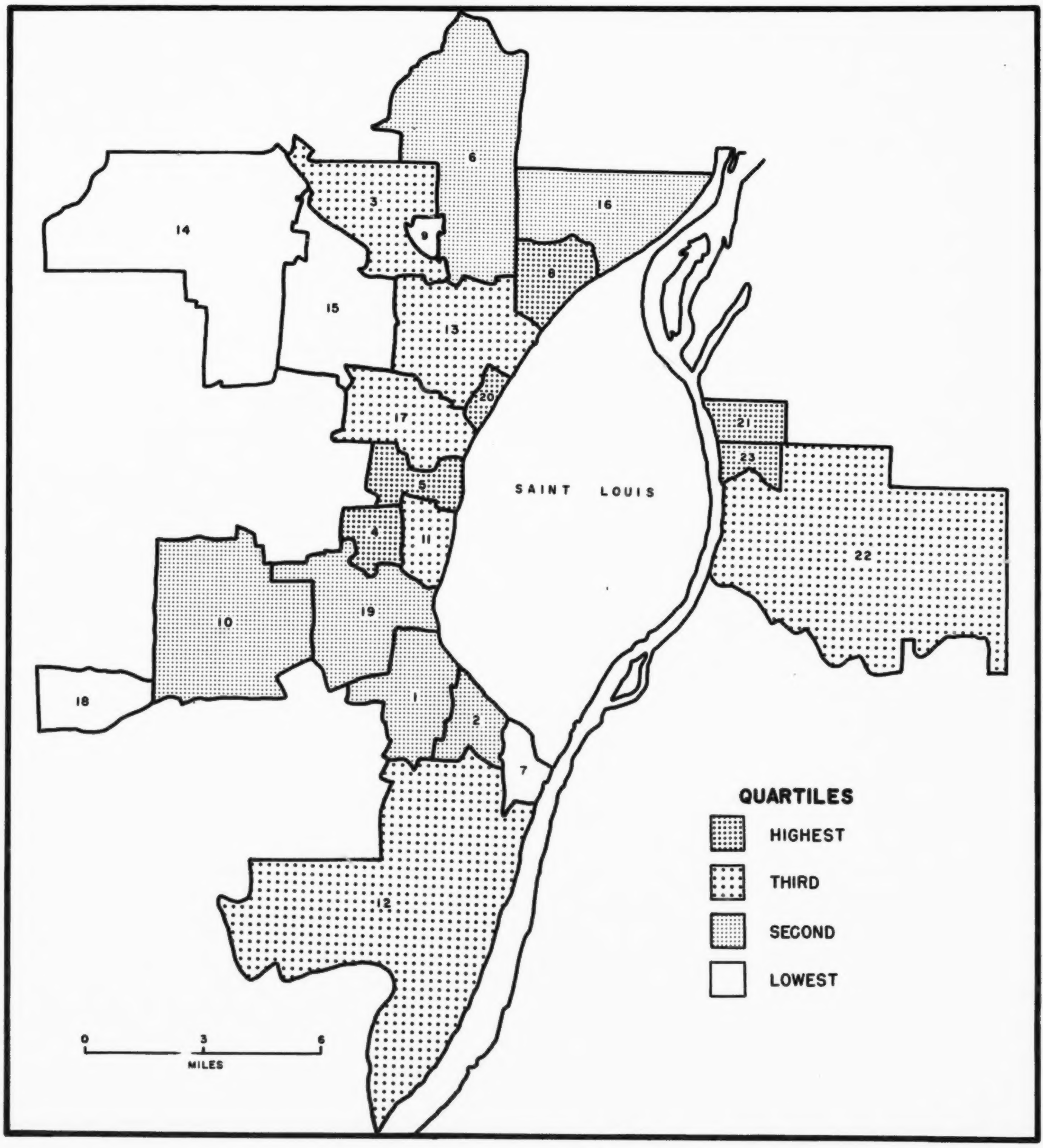
Map 3.5c: St. Louis - On Property Valuation, 1950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Map 3. 5d: St. Louis - On Property Valuation, 1960